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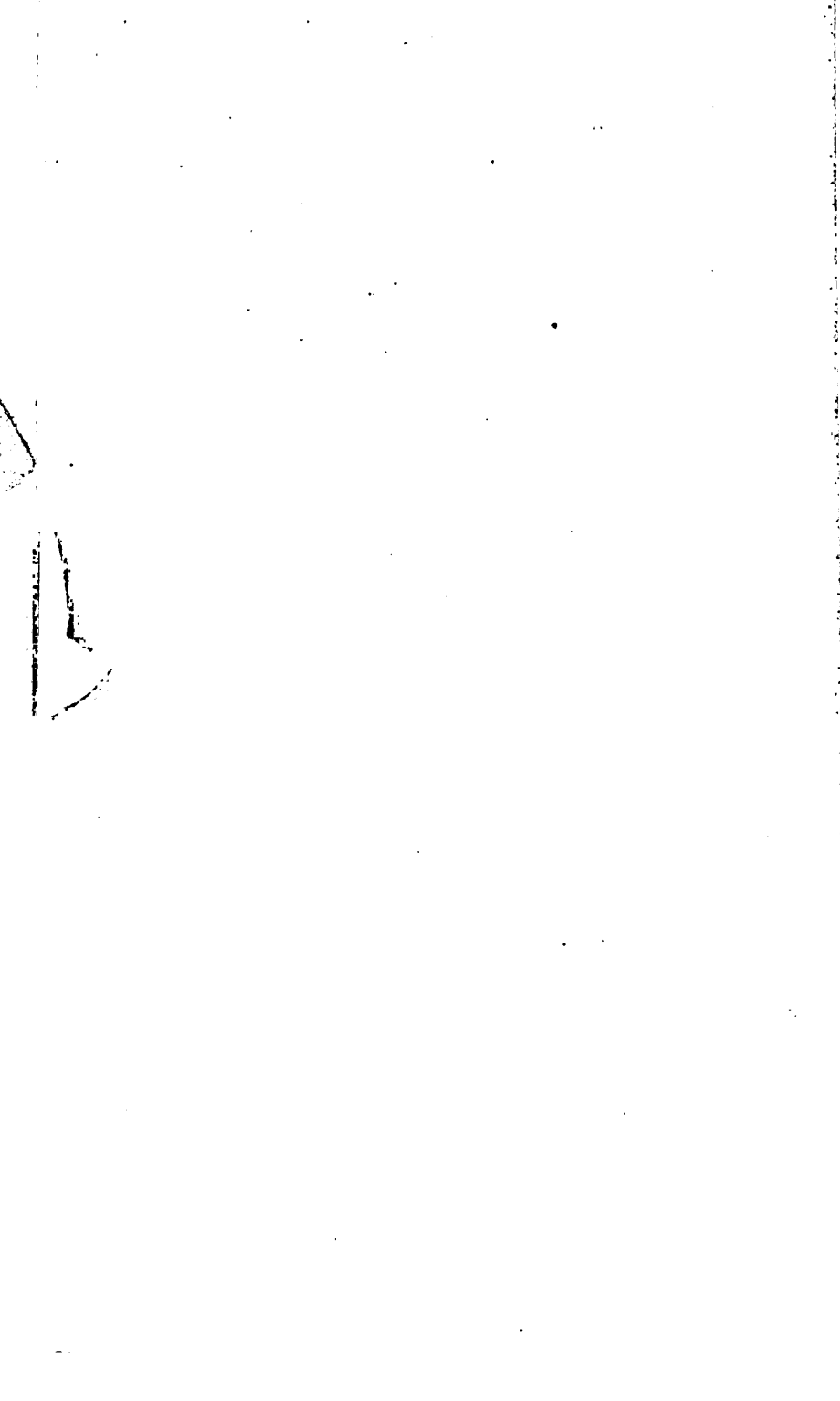
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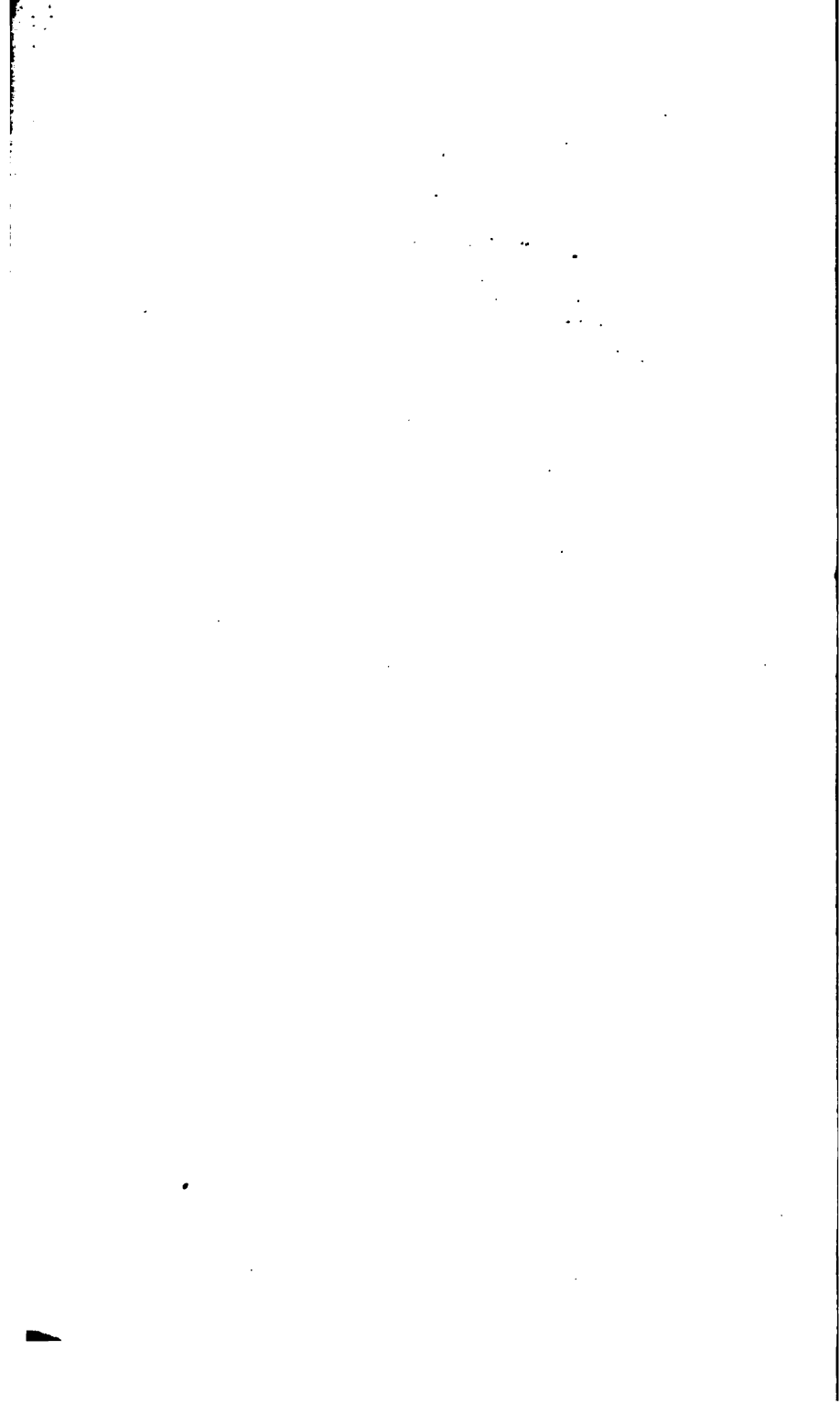
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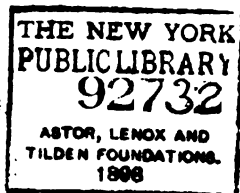
CHAPTERS ON HOOFED ANIMALS.

By R. LYDEKKER.



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PREFACE.

THE following chapters on various groups of Hoofed Big Game originally appeared as articles in the *Field* and *Land and Water*, where they were accorded such a favourable reception as to induce the belief that their re-issue in a collective form would prove acceptable to a large number of readers. The chapters that were first published in the latter of these two journals are the first, sixth, and eighth; and the Author has to return his thanks to the Publisher for kindly permitting their reappearance in their present guise. Since their original appearance several of the chapters have been more or less recast, in order to bring them up to the present state of zoological knowledge; while they have been embellished by the addition of a number of new illustrations. For permission to make use of certain figures, the Author is indebted to Colonel Biddulph, Drs. Guillemard and Sclater, and Messrs. A. and C. Black, W. Blackwood and Sons, A.

Gordon Cameron, Abel Chapman, Spencer Churchill, J. E. Harting, A. O. Hume, Macmillan and Co., H. Murray, E. Stanford, and Rowland Ward, to whom his thanks are hereby tendered.

The whole of the animals treated of in this volume come under the designation of "Big Game," but include only certain groups of the order of Hoofed Mammals. In some of the chapters the whole of the members of particular groups are briefly surveyed; while in other cases geographical distribution constitutes the limitations of the subject-matter. In both instances it is hoped that the sportsman desirous of attaining some knowledge of the natural history of the animals with which he is brought into contact may find much that may interest him. While attention has been directed to the maximum dimensions attained by the horns or antlers of many of the species noticed, it has been thought unnecessary to enter very fully into this part of the subject, since this has been so thoroughly elaborated in Mr. Rowland Ward's well-known work on "Horn Measurements." On the other hand, the relations existing between different groups of Horned Game, and the past distribution of such groups or some of their representatives, have received a fuller meed of attention, since these are subjects which too frequently fail to

obtain the amount of notice that their intrinsic interest demands. A certain amount of technicality in a work of this nature is inevitable, but such technicalities have been used as little as possible, and when employed are generally explained; while scientific names have been kept in the background. Although the book contains much more zoological details than are to be found in the majority of sporting works, the Author hopes that the popular style in which it is written will render it acceptable to all sportsmen interested in Big Game, while it may not be unworthy of the notice of the professed naturalist.

August, 1893.

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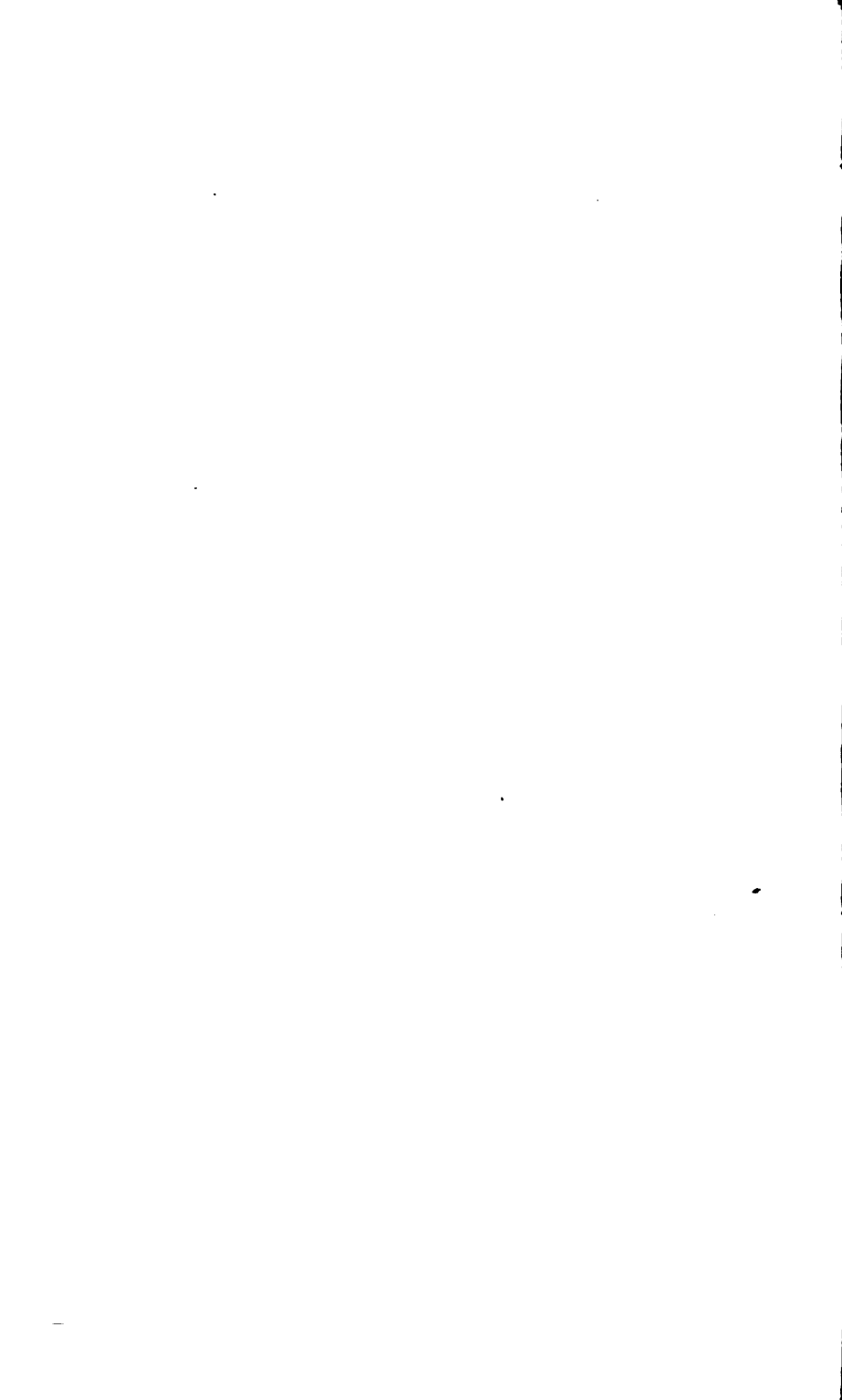
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CORRIGENDA.

PAGE 265, line 5 from top, for "*Carriacus*," read
"*Cariacus*."

Page 279, line 8 from top, for "*kashmirianus*," read
"*cashmirianus*."

HORNS AND HOOFS

OR

CHAPTERS ON HOOFED MAMMALS.

CHAPTER I.

WILD OXEN.

ALLOWING that the wild sheep and goats take the first place among the hollow-horned ruminants on account of the beauty and proportionately enormous size of the horns of some of the species, while the antelopes attract a well-merited attention from the great variety of shape and the extreme gracefulness of these appendages, the wild oxen may surely claim a special distinction, not only on account of their being the largest representatives of the entire group, but also as being the only ones whose pursuit, as a general rule, is attended with danger from the animals themselves. It is true, indeed, that, with the possible exception of some specimens of the

Indian buffalo, the horns of the wild oxen are by no means so long in proportion to the size of the animals themselves as are those of the markhor among the goats, or Marco Polo's argali among the sheep ; yet, since they generally exceed those of all other ruminants in absolute bulk and massiveness, they form some of the most highly-prized and magnificent of sporting trophies. When we add to this the personal danger which has frequently to be undergone in their acquisition, few will deny that a fine series of heads of wild oxen forms one of the most striking collections that a sportsman can obtain.

At starting we may explain that under the term wild oxen we include all the species technically spoken of as Bovine Ruminants, such as the true oxen, the bisons, yaks, and buffaloes. All these terms have a definite and restricted meaning, but, by a curious perversity, they have been strangely misapplied by sportsmen and traders. Thus the American bison is commonly spoken of by our Transatlantic cousins as the buffalo, the name "buffalo-robbs," applied to the skins of these animals, having come into such universal use that it is hopeless to try and alter it. Then, again, Indian sportsmen almost invariably call the Indian gaur, which is closely allied to the true oxen, the bison

whereas it is totally different from the animals properly so called.

We have said that oxen form one section of the great group of Hollow-horned Ruminants, which likewise includes the antelopes, sheep, and goats, and collectively constitutes the family *Bovidæ* of naturalists. It is, therefore, advisable in the first place to consider some of the leading characters by which they are distinguished from their allies. In some respects it would appear that the oxen are most nearly related to the sheep and goats, with which they are connected by the musk-ox, to be noticed in the sequel; but we may observe that whereas all the oxen differ from the sheep, goats, and musk-ox in having their upper grinding-teeth of great width, yet similar teeth occur in certain antelopes—such as the oryx—and since some of the buffaloes approach that group, it is probable that it is in that direction that the connection is really the closest.

As a rule, oxen are large, massively-built animals, with the neck very short and thick, and the short, heavy head carried nearly in the line of the back. In these respects they differ very markedly from most of the antelopes, but are approached by some of the sheep. Then, again, the males are nearly always characterised by the presence of a large

"dewlap" running down the throat from the chin to between the forelegs. This appendage is not, however, absolutely distinctive of the oxen, since it is found well developed in the eland among the antelopes. In their long and cylindrical tails, which are generally tufted at the end, although occasionally covered with long hair throughout their length, the oxen again resemble antelopes like the oryx, and differ from the wild sheep and goats. In all oxen the muzzle is broad, naked, and moist, and is thereby very different in appearance from the narrow, hairy muzzle of the sheep and goats.* There are never any traces of "tear-pits," like those of many antelopes, on the face of the oxen, neither has the skull any depression or slits below the eye-sockets.

Lastly, but not leastly, we have to consider the horns, which are present in the two sexes, and of nearly equal size in both. In this respect there is another marked difference from the sheep and goats, in which the horns of the females are invariably small and insignificant; and here we again note another point of resemblance to some of the antelopes, like the oryx and, in a lesser degree, the eland. Whereas, however, the bony cores of the horns of most antelopes are nearly solid through-

* The tahr, among the goats, has a small naked muzzle.

out, in the oxen these appendages resemble those of the sheep and goats in being extensively honey-combed by large cavities in their interior. The horns themselves may be either cylindrical or somewhat angulated, and are generally placed near to, or actually on, the summit of the skull, from whence they sweep in a more or less outward direction, and then curve upwards, and sometimes inwards, at their extremities. In no instance do they assume a spiral form, neither are they ever marked by the prominent transverse wrinkles or knots with which those of so many sheep and goats are ornamented.

Although all living wild oxen have horns in both sexes, yet certain fossil species are known in which these were absent in at least the females, and it has been suggested that it is due to this circumstance that "polled" races of oxen are so readily produced, this being, in fact, a reversion to a condition in which both sexes of the ruminants were normally hornless.

Such, then, are the leading external features of the oxen. With regard to their geographical distribution, wild oxen have the greater number of species on the continents of the Old World, the American bison (with the exception of the aberrant musk-ox, which represents a distinct group) being their only representative in the New World. In the islands of

the Old World we have a single small species of Celebes, and another in the Philippines. Geologically the oxen are a comparatively modern group, their earliest known representatives occurring in India in that portion of the Tertiary period known as the Pliocene. These early forms are most nearly akin to the Indian buffalo and the anoa, or wild ox of Celebes; and since all these are more antelope-like than the larger species, it is not improbable that oxen on the one hand, and sheep and goats on the other, have been derived from a common ancestor partaking of the character of the antelopes, which are the oldest known representatives of the hollow-horned ruminants.

As we have said, wild oxen are commonly divided into true oxen, yak, bisons, and buffaloes, the Indian species forming a sub-group of the former. By the late Dr. Gray and many writers each of these five groups was regarded as a distinct genus, while a sixth was made for the reception of the wild ox, or anoa, of Celebes. The distinctions between these various groups are, however, but slight, and are very difficult to lay down; and it therefore seems more convenient to include the whole of them in the single genus *Bos*, an arrangement which at least has the supreme merit of simplicity. We shall accordingly treat of the various species under the

headings of (1) aurochs and zebus, or true oxen, (2) gaur, (3) yak, (4) bison, (5) buffalo, reserving a separate section for the consideration of the musk-ox, which is placed in a separate genus, *Ovibos*, as being quite distinct from the oxen on the one hand, and from the sheep on the other.

I.—AUROCHS AND ZEBU, OR TRUE OXEN.

Of this group we have now, unfortunately, no living really wild representatives, it being even doubtful whether the half-wild cattle of Chillingham and some other British parks are the actual direct descendants of the old European wild ox, or whether (as the late Mr. Alston considered) they are derived from a race escaped from domestication. Be this as it may, there is ample historic evidence to prove the former existence of gigantic wild oxen on the continent of Europe, this evidence being supplemented by the occurrence of the skulls and other parts of the skeleton of these animals in the superficial deposits both of the continent and our own islands.

An excellent account of the half-wild oxen of the British parks is given by Mr. Harting in his work on "Extinct British Animals." It appears probable

that the aurochs*—or urus, as the original wild oxen were called—lingered on in Germany till the sixteenth century. They are mentioned in the "Niebelungen Lied" of the twelfth century, while we have evidence that two centuries earlier they were sufficiently common in Germany and Switzerland to form an important article of food. Cæsar



FIG. 1.—SKULL OF THE AUROCHS. About $\frac{1}{8}$ natural size. (From Owen.)

alludes to them as but little inferior in bulk to elephants. Their semi-fossil remains occur in the shell-marls and alluvial deposits of a large portion of Europe, the figured skull (Fig. 1) being from a turbarry in Scotland. The horns in this specimen are very much extended outwardly, so that their

* This name is often incorrectly applied to the bison.

span attains the enormous length of 42in.; and this span would, of course, have been still greater when they were covered with their horny sheaths. In the still older brick-earths of the Thames Valley the skulls of the aurochs, which are obtained in company



FIG. 2.—HEAD OF CHILLINGHAM PARK BULL. (After Harting.)

with the remains of the mammoth and the extinct woolly rhinoceros, attain still larger dimensions, although, since the horns curve more forwards, their span is somewhat less. Indeed, as we go back from the half-wild aurochs of Chillingham Park to those

found in the fens and river-silts, and thence to those of the brick-earths, we find a progressive increase in their size, doubtless indicating that as the area over which they roamed became gradually restricted, the species itself decreased in size. Although the fossil aurochs was long described as a distinct species (*Bos primigenius*), there can be no doubt that it is really inseparable from those living in Cæsar's time ; while it is equally certain that the Chillingham Park cattle, as well as many of our larger domestic races, can trace back their ancestry to this parent stock, although, as already stated, it is by no means certain that they have not been domesticated at some period.

That the wild aurochs was very widely spread over Europe, there is abundant evidence, since its remains have been obtained from the British Isles (exclusive of Ireland), France, Switzerland, Italy, Scandinavia, Germany, and Austria. That it extended into Russia may be taken as certain, but its extreme easterly and northern limits are still unknown. The stories of conflicts with gigantic bulls, so common in classic literature, lead, however, to the conclusion that the southern range of the aurochs included Greece, while fossil skulls show that it extended to Algeria.

Although in the middle ages aurochs inhabited the great Black (Hercynian) Forest of South Ger-

many, yet the open plains frequented by the vast herds of half-wild cattle, which have overrun large areas in Russia, Argentina, and Australia, suggest that originally they were inhabitants of the open country rather than forests.

The special character of the aurochs and domestic cattle, as distinct from other kinds of oxen, are to be found in the circumstance that the horns are round, and situated at the extreme apex of the skull (Fig. 1), with their upper border at first convex, while the tail is long, and the spines of the vertebræ of the withers are not so elongated as to form a prominent ridge in this region. Moreover, the forehead is nearly flat, and much longer than broad, so that the cavities for the eyes are widely separated from the roots of the horns.

To decide as to what was the colour of the aurochs may seem a very difficult matter. But the prevalence of shades of dun and red, more or less mingled with white, in our domestic breeds (the otherwise white Chillingham cattle having reddish ears), renders it most probable that these colours also predominated in their wild ancestors. And it may be further suggested that the absence of white "stockings" as a distinctive feature of most of our domestic breeds indicates that these were not present in the wild aurochs.

The only other living representative of this group is the zebu (*Bos indicus*) of India, China, Africa, and Madagascar. In this ox, while the skull agrees with that of the aurochs in its long forehead and cylindrical horns, it differs in that there is a certain degree of convexity in the forehead, and also by the circumstance that the upper border of the horns is



FIG. 3.—BACK VIEW OF THE SKULL OF THE GALLA OX. (After Rütimeyer.)

concave throughout (Fig. 3), whereas in the aurochs it is convex at the first curvature (Fig. 1). The fleshy hump on the withers, the enormous dewlap, and the very general presence of a white ring round the fetlocks are other characteristics of the zebu, of which there are many races, varying greatly in size.

What were the original home and parentage of the zebu are, however, still undecided points; but the late Mr. Blyth considered that it may have had an African origin. In the curvature of the horns and some other features of the skull the zebu, and especially the large variety from the Galla country, of which the skull is represented in Fig. 3, approach the next group, and it is to the banting that Professor Rüttimeyer, of Basle, who has devoted much attention to the group, considers they come nearest.

In addition to an extinct species (*Bos acutifrons*) with a convex forehead and enormous horns, from the Siwalik Hills of Northern India, we may observe that in that country during the early human period there existed the extinct Narbada ox (*Bos namadicus*), whose remains occur in the gravels of the valley of that river. This fine species is of especial interest, on account of the circumstance that while in one race the horns were cylindrical, like those of the aurochs, in another they were somewhat flattened, and thus approach those of the next group, although retaining the curvature found in the aurochs.

II.—GAUR.

This group, named from its best-known representative, is exclusively confined to India, Burma, and

the Malayan regions, and includes three species, two of which are the handsomest of existing wild oxen. The group, of which an excellent account is given by Mr. Blanford in a paper published in the Proceedings of the Zoological Society for 1890, is distinguished from the aurochs-group by the following characteristics. In the first place, the horns are always more or less flattened, so that their cross-section is elliptical; this flattening being most marked at the base, and more so in the bulls than in the cows. Then, again, the tail is relatively short, only reaching just below the hocks, while the lower portions of the legs from just above the knee and hocks downwards, are white, or whitish. Another very characteristic feature is a distinct ridge running from the shoulders to near the middle of the back, where it ends very abruptly, this ridge being produced by the great length of the spines of the vertebræ in the fore part of the trunk. Mr. Sanderson states that in some old bulls the drop at the end of this ridge is five inches. In addition to their white "stockings," the members of this group are characterised by the dark brown, or nearly black, colour of the adult bulls. The calves are reddish-brown, and in one species this tint persists in the adult cows, although in the other two the colour of the cows is only rather lighter than that of the bulls. The hair is very fine

and glossy, so much so that in one species (the gayal) it has been appropriately likened to seal-skin. The two Indian species are magnificent and thoroughly game-looking animals. Their "spoor" is easily distinguished from that of the more clumsily built buffalo by the sharply-pointed and neater imprint of the hoofs.

The first and best known species is the gaur (*Bos gaurus*), the misnamed bison of Indian sportsmen, which occurs not only in India, but also in Burma and the Malay Peninsula. A young bull gaur from Pahang, in the Malay Peninsula, was exhibited in 1891, in the Zoological Society's Gardens; and a coloured plate of this animal is given by Mr. Blanford in the paper cited; but, as remarked by that writer, a young tamed specimen fails to give any adequate idea of the magnificent proportions attained by the bulls in their native wilds.

The male gaur when adult will stand fully as much as six feet (eighteen hands) in height at the shoulder, and in some instances is said to exceed this measurement by more than an inch. The species is readily characterised by the hollowness of the forehead and the high, overarching bony ridge, with a convex upper border, between the horns. The horns themselves are much curved, so as to form a kind of crescent, with their tips turned inwards. In colour

they are greenish-grey near the roots, and become gradually darker towards the tips, which are black. In size they may measure as much as 19in. or 20in. in basal circumference, and 3ft. 3in. across the

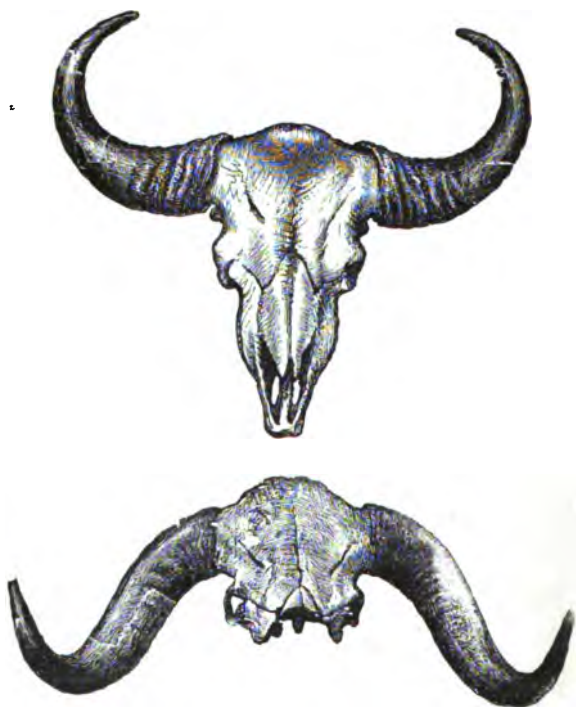


FIG. 4.—SKULL OF GAUR, AND ABNORMAL HORNS OF SAME.

sweep, the tips being separated by an interval of from 19in. to 22in.

In regard to its distribution, it appears that the gaur

is now unknown in Ceylon (apart from the question whether it ever occurred there), but that in India it is found in all the larger forest regions, from Cape Comorin to the foot of the north-eastern Himalaya. To the north-west, according to Mr. Blanford, its approximate limits are marked by the valley of the Narbada ; and in the extensive grass-jungles of the Ganges it only occurs along the foot of the Himalaya. From Nipal it extends through the hilly regions south of Assam into Burma, and thence into the countries forming the eastern shore of the Bay of Bengal as far as the extremity of the Malay Peninsula. Its occurrence in Siam has been reported. To the Malays the gaur is known as the *sladong*.

In habits the gaur is essentially a forest and hill-loving animal, and it is but seldom that it is found on low ground. Its shy and retiring disposition, as well as its extreme quickness of hearing, are known to all who have been engaged in its "shikar." Some of the favourite hunting-grounds are the bamboo jungles of the Satpura range of Central India, in the neighbourhood of Seoni and Pachmurri, and also in the Wynaad district of Madras. Excellent accounts of gaur-stalking are given in Colonel Campbell's "My Indian Journal," Captain Forsyth's "Highlands of Central India," Mr. Sanderson's

"Thirteen Years Among the Wild Beasts of India," and many other works. One of the finest collections of gaur skulls shot by a single sportsman that we have seen was made by Captain Sullivan, of the 15th Hussars, during the long period that regiment was stationed at Meerut in the seventies. Occasionally, as shown in our figure, gaur are met with having the horns abnormally bent downwards.

Among the fossil oxen of the Narbada Valley is one which appears to have been closely allied to the gaur.

Very different in appearance to the gaur is the gayal, or mithan (*Bos frontalis*), of which the female is represented in Fig. 5. The distinctive features of this species are that the forehead is flat, and that the upper part of the skull forms a perfectly straight line between the widely-separated horns. The latter are rather shorter, and much less curved than in the gaur, their tips not inclining inwardly. Moreover, the whole head is shorter than in the latter, while the legs are also shorter, and the dewlap of the bull is larger.

Gayal have been frequently exhibited in the Zoological Society's Gardens, where they have bred, and have likewise interbred with other species of oxen. Mr. Sclater figured a young male in the "Proc. Zool. Soc." for 1866, pl. i.; while another coloured plate

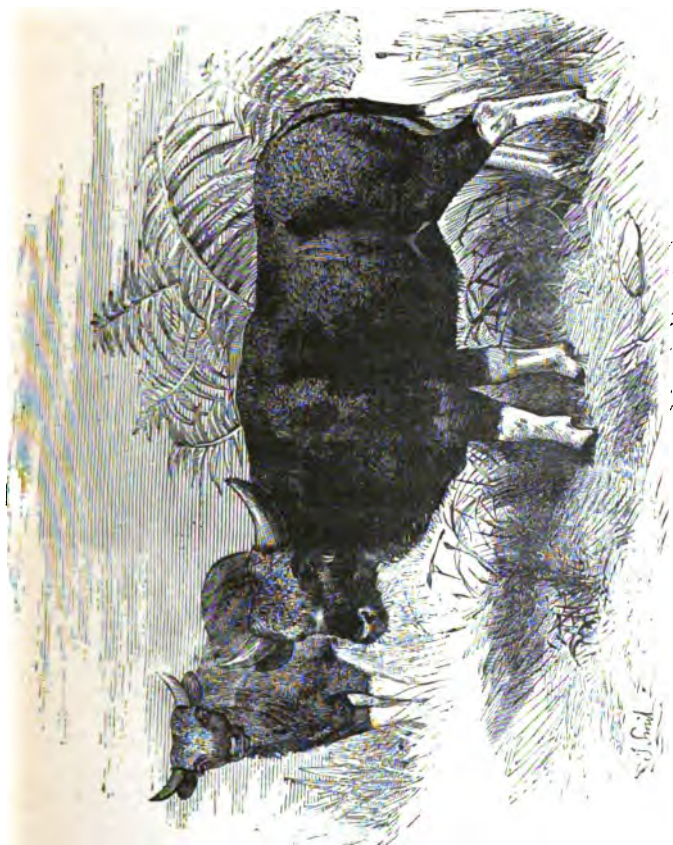


FIG. 5.—COW GAVALS. (From Sclater.)

in the volume for 1882, pl. x., represents a cow with a calf. Mr. Blanford, in the paper cited above, gives a woodcut taken from the photograph of a bull, living some years ago in the Calcutta Zoological Gardens, which affords an excellent idea of its proportions. The specimen in question, which the writer often saw, was indeed a magnificent beast; those which have hitherto been exhibited in this country giving no adequate idea of the size which the animal attains.

Curiously enough, we have had till lately no definite knowledge of the existence of gayal in a wild state; the account given by Mr. Macrae years ago of the taming of wild gayals by the Kuki tribes not improbably referring to the gaur. Some have even gone so far as to say that the gayal is but a domesticated race of the gaur; but the very marked differences between the two, coupled with the constancy with which these differences are maintained, leave, however, no doubt that they are totally distinct species.

In a tame condition the gayal is kept by the hill-tribes of Assam, Chittagong, and Arakang, as far south as the district of Akyab; but it appears certain that it does not exist in a wild condition in any of these districts. The degree of domestication of these gayals does not seem, however, to be very

great, the herds being left to wander very much after their own will in the jungles. At one time it was thought that wild gayal might be found in the little-known Mishmi hills, on the north of Assam, but the wild cattle of these districts have proved to be gaur. Thanks, however, to the investigation of Mr. Blanford, it now turns out that the home of the wild gayal is in the hills in the interior of Tenasserim.

Like the gaur, the gayal is essentially an inhabitant of hill-forests ; and its power of getting over the roughest and steepest ground is perfectly astonishing for an animal of its bulk and size.

In India gayal will readily interbreed with the humped domestic cattle (zebu), and similar hybrids have been produced in the Zoological Society's Gardens. One of these hybrids was crossed with a bull American bison, and produced a cow-calf, which when adult was not unlike a gayal, although without the white stockings, and with a longer tail. The pure-bred gayal calf figured by Mr. Sclater is of a light-brownish red, with the throat, chest, and inner sides of the legs white. The disappearance of so much of the white and of the red from the outer sides of the leg in the adult is a very remarkable circumstance. The free breeding between such different looking animals as a half-bred gayal and a bison shows how closely related all the oxen really are.

With the banting (*Bos sondaicus*), which is confined to the countries on the eastern side of the Bay of Bengal, we come to the last representative of the group, and one differing very widely from the gaur and gayal, and serving in some respects to connect them with the aurochs. Moreover, instead of being a hill-loving animal, the banting frequents the lowlands.

In regard to coloration the banting is broadly distinguished by the presence of a white patch on the rump extending to the base of the tail, and also by the reddish-brown, almost chestnut hue, of the adult female. Then, again, the ridge on the back is much less prominent, and does not terminate so suddenly as in the other two species. The skull is also longer and narrower, and the horns are smaller and more curved, with their points turned inwards, and their flattening so little marked that it is frequently imperceptible in the cows. Finally, the legs are decidedly longer in proportion than in either the gaur or the gayal, and the tail reaches below the hocks.

The retention of the colour of the calf by the adult cow banting, coupled with the resemblances of this species to the true oxen, suggests that it is the one most nearly allied to the ancestral stock of the present group; the dark colour of the male banting, and of both sexes of the two allied species, being

probably an acquired and special feature not found in the aurochs group.

According to the late Mr. Blyth, the banting inhabits Burma, the Malay Peninsula, Sumatra, Borneo, and Java, while it has been domesticated in the small island of Bali, at the south-eastern extremity of Java, and is also found wild in the mountains of the interior. How far to the eastward the range of this species extends in the Indo-Chinese countries still remains to be determined. Mr. Blandford considers it not improbable that the wild ox known to the Malays by the name of the sapio may be a variety of the banting in which the white stockings of the typical race are stained a rusty tint. In Java large herds of domesticated banting exist in addition to the wild race; and it is stated that it is from these herds that the natives of Bali are in the habit of replenishing their stock.

It appears that in Java, at least, wild bull banting are exceedingly difficult to find. We have, however, seen a record of an instance where a traveller quite unexpectedly came across a magnificent dark-coloured bull, standing quietly ruminating on the bank of a river. A full-grown bull banting from Java has been recorded to attain a height of 5ft. 9½in. at the withers; but in Burma the maximum height appears to be 5ft. 4in. (16 hands.)

Banting have been crossed with the humped domestic cattle of Java, and the resulting progeny have received a distinct name (*Bos leucoprymnus*), in allusion to the white patch on the rump.

III.—YAK.

This group is now represented only by the Tibetan yak (*Bos grunniens*), which appears to connect the preceding group with the bisons. The yak is readily distinguished from the gaur by the fringe of long hair investing the shoulders, flanks, thighs, and tail, and also by the peculiar pig-like grunting sound it utters, which is quite unlike the lowing of the true oxen. Although the withers are high, there is not the distinct ridge on the back so characteristic of the gaur. The skull, although long and narrow, has the region between the eyes and the occiput short and broad, as in the latter, with which it also agrees in that the bones forming the extremity of the muzzle (*premaxillæ*) do not extend upwards to join those roofing over the cavity of the nose (*nasals*), as they do in the true oxen. The forehead is, however, slightly hollowed, and the large horns, which are cylindrical, very wide apart at their bases, and curving at first outwards and forwards, with their tips turned inwards, are placed somewhat below the

summit of the skull. In consequence of this we see in the front view of a yak's skull (Fig. 6) a small prominence between the horns formed by a boss of bone at the top of what is known as the occiput, the crest or summit of the latter being invisible from the

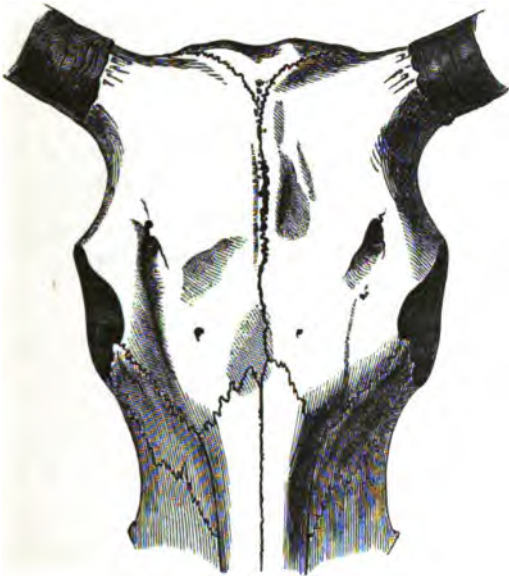


FIG. 6.—FRONT VIEW OF PART OF THE SKULL OF THE YAK.
(*Bos grunniens*). (From Rütimeyer.)

front, and the shape of the whole occiput forming an inverted V (Fig. 7). There is no dewlap, and the number of ribs is fourteen. The male yak does not stand quite so high as the gaur; but in fine examples

the horns may measure some 39in. in length, with a basal circumference of 17in. or 18in. The general colour is brownish-black, tending to rusty brown on the flanks and inner sides of the limbs. All the specimens showing white on the tail or other parts belong to domesticated and generally cross-bred animals.

Wild yak inhabit Chinese Tibet, and probably range northwards as far as the Kuen Luen range,

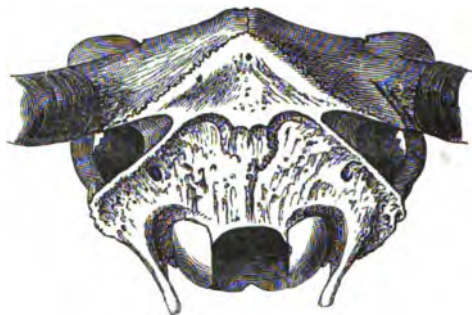


FIG. 7.—BACK VIEW OF PART OF THE SKULL OF THE YAK.
(*Bos grunniens*). (From Rütimeyer.)

while westwards their limits extend to the Karakoram and the frontiers of Ladak. They are extremely impatient of heat, and are only found at very great elevations, reaching nearly or quite up to 20,000 feet. Like other large Tibetan animals, they thrive upon coarse and scanty herbage, in districts where there appears scarcely maintenance for a rabbit. Prejevalsky in his Central Asian journeys met with

abundance of yak, some of which he regarded as indicating a second species (*Bos mutus*). From the accounts of native Indian travellers they appear to be common in Chinese Tibet within a short distance of the Ladak frontier. In Ladak itself (which is the only portion of their range readily accessible to the English sportsman) they are, however, now very rare, most or all of the bulls found within the accessible parts of these limits being stragglers from Chinese Tibet. When in these regions a few years ago the present writer could not hear of even a single specimen having been seen during that particular season. This extreme rarity, coupled with the magnificent appearance of the animal itself, makes yak shooting the "blue ribbon" of Himalayan sport.

At the time, however, when Ladak had but recently become accessible to the European sportsman, yak seem to have been by no means uncommon. At a much later period General Kinloch, who shot mainly, I believe, in the Changchenmo district—lying considerably to the northwards of the Pang-kong lake—wrote as follows: "Yak seem to wander about a good deal. In summer the cows are generally to be found in herds varying in number from ten to one hundred, while the old bulls are for the most part solitary, or in small parties of three or four. They feed at night, or early in the morning,

and usually betake themselves to some steep and barren hillside during the day, lying sometimes for hours in the same spot."

The terrible nature of the winter climate of the regions inhabited by a yak is, perhaps, best evidenced by the well-known account given by the missionaries Huc and Gabet in 1846, in which they relate having seen a herd of more than fifty of these animals firmly frozen in the ice of one of the headwaters of the Yang-tsi-kiang river, which they had imprudently endeavoured to cross.

The extreme importance, or perhaps, we should rather say, the absolute necessity, of yak in crossing the higher Tibetan Himalayas is too well known to need more than passing mention. Pure-bred yak, such as those met with in Rupsu, in travelling from Ladak to Simla, have, however, the disadvantage that they will not eat grain, thus entailing the necessity of making forced marches from one halting-place to another where grass may be obtained. On this route the domesticated yak are of large size, and when not constantly in use are troublesome beasts. The writer well recollects one occasion when his camp-equipage had to be carried by yak which had done no work for two or three seasons. After rising at dawn, on a bitterly cold morning, in order to make an early start for a long day's march, no

sooner were the various packages strapped upon the yak, and their heads let go, than they commenced to kick and plunge, and ended by freeing themselves from their drivers and scouring over the plain, scattering plates, dishes, chairs, bedding, &c., in glorious confusion for half a mile round. In the more easterly Himalayas, near Darjiling, the domestic yak, as mentioned in Sir J. D. Hooker's "Himalayan Journals," are of much smaller size. It is mainly, or entirely, of this small race that living examples have been exhibited in the Zoological Society's Gardens; and it is in great part due to these diminutive specimens that such inadequate ideas of the magnificent proportions of the wild bull yak, or even of the larger domesticated race, are prevalent.

Domestic yak breed readily with the ordinary hill cattle of the Himalaya, the hybrid between the bull yak and the hill cow being known as the zomo. Many of these hybrids are parti-coloured, while a considerable proportion of them are "polled." It is entirely from these half-bred races that the white tails, or "chowries," so extensively used in the plains of India as fly-flappers are obtained. Many of these half-breeds are much less intolerant of heat than pure-bred yak, and they are frequently employed as beasts of burden in the hot Indus valley between Ladak and Kashmir, where the pure-bred animal

could not exist. In the Siwalik Hills of Northern India there are found remains of a fossil ox (*Bos sivalensis*) which, while evidently a first cousin of the yak, had the horns placed still lower on the skull, thus approaching the bison.

IV.—BISON.

With the bison, of which there are two living species, we come to a group agreeing with the yak in their cylindrical horns and the shortness of the forehead of the skull, the eye-sockets being thus much nearer to the horns than in the aurochs (Fig. 1). The horns are, however, placed still more below the summit of the skull, and thus, for the first time among the oxen, the crest of the true occiput is visible in a front view of the skull. Moreover, the forehead is very convex, the eye-sockets are tubular and prominent, and the *premaxillæ* are more widely separated from the very short *nasals*. In build, bison are characterised by the great excess in the height of the withers over the hind-quarters, thus producing a kind of hump on the shoulders. The great development of the fore-quarters is intensified by the mass of long and dark hair covering the head, neck, chest, and shoulders, and extending far down on the fore limbs. This long hair is also continued

from the head along the middle of the back nearly as far as the root of the tail, the tail itself being tufted at the end, and reaching somewhat below the hocks. The rest of the body is covered with short curly hair of a lighter brown. The presence of fourteen or fifteen pairs of ribs is an important character distinguishing bison from the true oxen and gaur, as well as from buffalo.

The true, or European, bison (*Bos bonasus*), also known as the wisent or zubr, which was formerly widely spread over Europe, now exists in a protected condition in the forest of Bialowicza, in Lithuania, and likewise in the Caucasus, and perhaps also Moldavia and Wallachia. In the Caucasus it has recently been successfully stalked and killed by Mr. St. George Littledale, to whose generosity are due a mounted pair which now grace the Natural History Museum. An account of the habits of the Lithuanian herd is given by Dolmatoff in the "Proc. Zool. Soc." for 1848. A skin and skeleton from the Lithuanian preserve were presented to the British Museum by the Emperor of Russia about the year 1846, while somewhere about 1858 a living pair of these animals were presented by his Imperial Majesty to the Zoological Society's Gardens, where they lived for some time, finally dying of pleuro-pneumonia. Since their death the species has only been

represented in the Gardens by examples bred in captivity.

By an unfortunate confusion the term aurochs has been almost universally applied to the bison, although, as we have already seen, it is really applicable to the wild *Bos taurus*. Like the aurochs, wild bison were sufficiently abundant during the ninth and tenth centuries in Switzerland and Southern Germany to be commonly used as food. They are likewise alluded to by Cæsar as inhabitants of the Black Forest. Their remains are met with in the superficial and cavern deposits of France, Switzerland, Germany, and Italy, as well as in those of our own islands. It is true, indeed, that the fossil bison have been regarded as a different species (*Bos priscus*), but since they present no distinction from the living race, except superiority of size and rather straighter horns, there are no sufficient grounds for their separation. Besides their occurrence in caverns, already mentioned, in Britain bison-remains are met with in the Thames Valley and other deposits containing those of mammoth, and also in the still earlier "Forest-bed" of the Norfolk coast. The species seems, however, to have disappeared from this country at an earlier date than the aurochs, none of its remains being recorded from the fens and turbaries, where those of the latter are

numerous. Northwards, the bison formerly ranged into Siberia ; while skulls, indistinguishable from those of the European species, have been obtained from the frozen soil of Kotzebue Sound, in Alaska, in company with those of horse, musk-ox, and mammoth. This extreme range is very interesting as tending to show how the two species may have originated from a common ancestor ranging into these high latitudes.

With the American bison (*Bos americanus*), of which we give a figure in the accompanying illustration, we come to a species which, till within the last few years, offered some of the finest sport, for those who estimate their success by the size of their bag, in the world, but which has been practically exterminated as a wild animal through human greed and folly. The sad story of the extermination of the buffalo (as Americans will persist in calling the animal) is graphically told by Mr. Hornaday.* This species is very like the European bison, its difference being summed up in the following quotation (with some emendation of names) from Mr. Hornaday, who observes of this animal that "his only rivals for the kingship are the Indian gaur (*Bos gaurus*) and the European bison, both of which really surpass

* "The Extermination of the American Bison." Washington. 1889.



FIG. 8.—THE AMERICAN BISON.

him in height, if not in actual bulk also. The European bison is taller, and possesses a larger pelvis and heavier, stronger hind-quarters; but his body is decidedly smaller in all its proportions, which gives him a lean and 'leggy' look. The hair on the head, neck, and fore-quarters of the European bison is not nearly so long or luxuriant as on the same parts of the American bison. This covering greatly magnifies the actual bulk of the latter animal. Clothe the European bison with the wonderful pelage of our bison, give him the same enormous chest and body, and the result would be a magnificent bovine monster who would indeed stand without a rival. But when first-class types of the two species are placed side by side, it seems to me that *Bos americanus* will easily rank his European rival." Mr. Hornaday then goes on to show how the bison kept in captivity degenerates from the magnificent proportions of the wild individuals. Since the year 1521 marks the epoch when the American bison was first seen by Europeans, it is but little more than three and a-half centuries from that date when its practical extermination was brought about. The countless multitudes in which this animal roamed over the North American prairies are too well known to call for more than passing mention; and its absolute fearlessness of man,

coupled with its general stupidity, are some of the chief causes which led to its annihilation. The completion of the Union Pacific Railway in 1869, which divided the bison into a northern and southern herd, marks the practical beginning of the end of their existence. The southern herd, whose numbers in 1871 was estimated at between three and four millions, had ceased to exist as a body by 1875, and in 1880 bison-hunting was given up as a profitable speculation. The month of February, 1883, witnessed the final annihilation of the northern herd, which was never so large as the southern; but this event came like a thunderclap on the hunters, who actually made preparations for another slaughter in the following autumn, only to find that their game had disappeared for ever. At the present time, with the exception of those preserved by the Government in the Yellowstone Park, bison are represented only by a few small parties, or individuals, scattered over the wilder regions; but it is doubtful whether even these will long remain.

Within historic times the American bison ranged from the Gulf of Mexico to the Great Slave Lake, west of Hudson Bay, these regions presenting variations of climate as great as those found in the range of the tiger from India to Siberia. Its remains are found in a sub-fossil condition in the superficial

deposits of the United States ; while an allied extinct species (*Bos latifrons*), distinguished by its superior size and stouter horns, which are less inclined backwards, is found in those of Texas.

The American bison will breed freely in captivity, not only with its own kind, but likewise with other species of cattle. We have already alluded to the hybrids obtained by crossing the bull bison with the cow gayal, and we may add that in the United States a breed has been established by crossing the bull bison with the domestic cow, the cow bison not producing a hybrid offspring. This hybrid race is perfectly fertile, either with itself or when again crossed with domestic cattle ; and it is considered that a strain of bison blood will eventually lead to a decided improvement in the cattle of the western ranches, which will then be better able to stand the "blizzards" of these rigorous climates. The figure on the next page shows a bull hybrid between the bison and domestic cow, taken from an animal in the herd of Mr. C. J. Jones, of Garden City, Kansas, who has done so much to promote these hardy breeds. We are informed that some of these half-breeds have been imported into Northumberland.

At the period when bison swarmed on the prairies shooting them must have been somewhat tame work,



FIG. 9.—YOUNG HYBRID BULL BETWEEN MALE BISON AND DOMESTIC COW.

owing to their indifference to the presence of man. In later years, however, when they had largely left the plains to seek refuge in the hilly regions, and had become more wary, they required somewhat careful

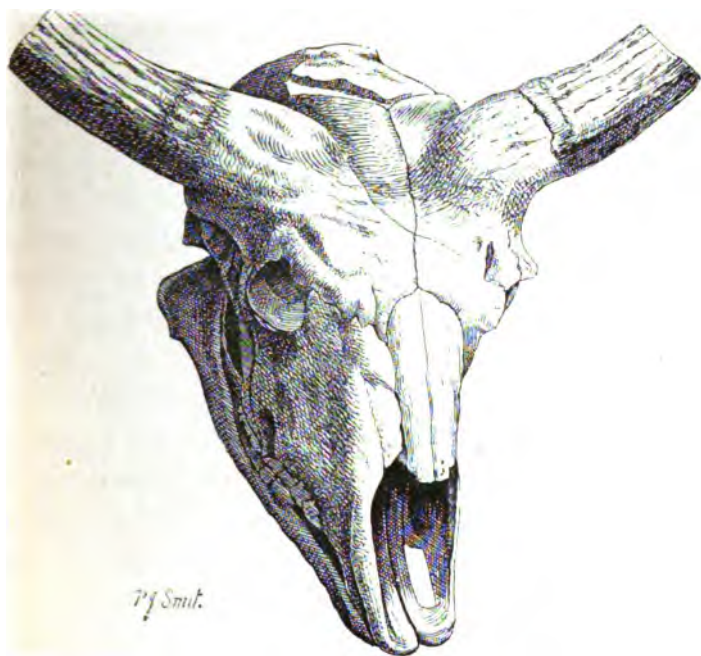


FIG. 10.—SKULL OF THE EXTINCT ETRUSCAN Ox, with the upper part of the horns cut away.

stalking. Sir Samuel Baker, in his fascinating work, "Wild Beasts and their Ways," gives us an account of bison-stalking in the Big Horn Range in 1881.

The magnanimity of this great sportsman in shooting but one bull when he had others within easy range, should serve as a lesson to those gunners whose sole aim appears to be the size of their "bag," and who have nothing of a naturalist's instinct to lead them to find interest in the contemplation of the habits and appearance of their game in their native wilds.

In this place we may refer to some very remarkable fossil oxen from the Pliocene deposits of Italy and Northern India, which may have been the ancestors of several or all of the preceding groups. From the figure of the skull of the Etruscan species (*Bos etruscus*) given in Fig. 10, it will be seen that the cylindrical horns are placed far below the summit of the skull, and close behind the eyes, and that their curvature approximates to that of the banting. Indeed, it seems, on the whole, that this type of skull comes nearer to that of the banting and its allies than to any other of the living oxen. Some of the females of these fossil oxen were hornless.

V.—BUFFALO.

This group is typically represented by wild species, both in India and Africa, two of which are of large dimensions. Buffalo are characterised by the horns being more or less distinctly flattened and angulated,

at least at the base, with their upper border concave, and their tips inclined inwardly. They are placed considerably below the summit of the skull, of which the forehead is generally more or less markedly convex, the premaxillary bones extending upwards to join the nasals. The withers form only an indistinct ridge, and the number of the ribs is thirteen. In build, buffaloes are clumsy and heavy animals, with the tail short, and the hair of the body sparsely distributed.

The group may be primarily divided into African and Indian species ; and, as is almost invariably the case, we shall find that the extinct species of the two countries are most nearly related to their living successors. With regard to the African buffaloes, there has been great confusion and uncertainty as to the number of species which exist, and the question is by no means yet settled. Thus, while Dr. Gray, recognised at least four species, Sir Victor Brooke* admitted but two.

The well-known Cape buffalo (*Bos caffer*) is one of the largest and fiercest members of the group. It is characterised by the great massiveness of the comparatively short horns, which are very deep and closely approximated at their base, forming in old bulls a helmet-like mass covering the whole of the

* *Proc. Zool. Soc.*, 1873, p. 474, and 1875, p. 454.

forehead. From this massive base the horns curve at first outwards and backwards and then forwards, upwards, and inwards, their outer portions being nearly cylindrical. The skull is relatively very short, sharply bent in a hollow below the horns, with very short nasal bones, and the eye-sockets, or orbits, not



FIG. 11.—HEAD OF CAPE BUFFALO.

very prominent. The general colour is blackish, and in many instances at least (although this has been denied) the ears are fringed with long hairs. In old animals most of the hair is worn off, leaving the skin nearly bare. A full-sized bull stands about 4ft. 10in.

at the withers, and the horns are remarkable for their great width at the base rather than for their length. The Cape buffalo is usually found in reedy swamps from the Cape as far north as the equator, but some individuals are found inhabiting heavy timber jungles ; these, according to Mr. Drummond, usually having blacker hair and more widely-spreading horns. The ferocity of a wounded bull, or, still worse, that of a cow with calf, is too well known to require more than passing mention, nearly all books of African sport teeming with anecdotes of hair-breadth escapes from the charges of these animals. The massive, horny shield on the forehead of the old bulls renders their head practically safe from a shot, and although it is just possible to kill them by a well-planted bullet in the line of junction of the two horns, scarcely anyone would attempt such a risky shot. The cow may, however, be dropped by a bullet in almost any part of the forehead. A fine stuffed pair, with the ears thickly fringed, are exhibited in the Natural History Museum, and were shot by Mr. Selous.

From the equatorial regions northwards to Abyssinia there occurs a rather smaller variety of this species, in which the horns are flattened and less thick in the forehead, and do not actually meet in the middle line, this variety having been described

as *Bos æquinoctialis* and *Bos centralis*. Although the whole build of the animal is lighter, and its disposition much less fierce than that of the Buffalo of the Cape, there are intermediate forms which forbid regarding it as a distinct species.

Passing to the Western side of Africa we come across a small buffalo, known to the natives as the niari, and which has been described under the names of *Bos pumilus* and *Bos brachyceros*. Sir Samuel Baker describes it as of "a fawn colour, with a tinge of dark chestnut, and about the size of a Jersey bull. The ears are long, and are tipped with a long tuft of hair; the eyes are large, the head remarkably small and delicately shaped; the horns are about twelve inches long, broad at the base, without much curve, and sharp at the points. The hair of the body is short and smooth. The tail is long, with a black tuft of hair at the extremity." Frequently the horns are widely separated in the middle of the forehead, and they may have distinct rings at their base, although they never show the downward curvature so characteristic of the Cape buffalo.

The niari was described and figured in Du Chaillu's "Equatorial Africa," but his artist, as Gray long since pointed out, represented the horns curving directly backwards instead of outwards. Had we this form alone to deal with there would be

little doubt as to its specific distinctness from its gigantic cousin of the Cape. Some of the specimens described as *B. centralis*, from Western Equatorial Africa, as shown by their larger dimensions and the contour of their horns, indicate, however, a transition from the niari to the Cape buffalo, so that it may eventually turn out that the former is nothing more than a very diminutive local race of the latter.

From the superficial or Pleistocene deposits of Algeria there have been obtained the remains of a buffalo (*Bos antiquus*) allied to the Cape species, but with far larger horns, which did not, however, extend over the forehead to meet in the middle line. When entire, the bony cores of these horns must have measured fully eleven feet from tip to tip along their greater curve, and when covered with the horny sheaths must have been still longer. The horns show the downward curvature at their base, and comparatively slight angulation in the greater part of their length characteristic of the Cape species, while the skull has the same relative shortness and want of prominence of the orbits, which are likewise such distinctive marks of the living African buffaloes. Other skulls of similar type have been obtained from corresponding beds at the Cape, and have been described under the name of *B. baini*, although there can be little hesitation in referring

them to *B. antiquus*. In one of these specimens (Fig. 12) the horns measure over eleven feet along the curve from tip to tip, while, in a second, they were estimated to reach at least fourteen feet. The prehistoric Africans must, therefore, have, indeed, had formidable beasts with which to contend.

With the arna (female arni), or Indian buffalo (*Bos bubalis*, or *B. buffelus*) we arrive at a very distinct section of the group, characterised by the long

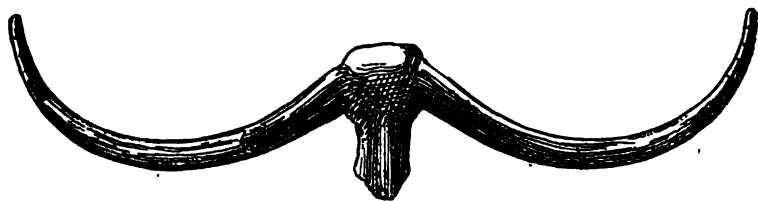


FIG. 12.—SKULL OF EXTINCT SOUTH AFRICAN BUFFALO. About $\frac{1}{16}$ the natural size. (From Seeley.)

and straight skull, in which the sockets of the eyes are very prominent and the nasal bones elongated, as well as by the marked angulation and flattening of the horns throughout their length. The horns are widely separated at their base, and instead of curving downwards, are directed either immediately outwards or more or less upwards; while the forehead of the skull is characterised by its extreme convexity. The arna is a native of the marshy grounds of India, being found in Bengal, Assam,

Burma, Central India, the swampy "terai" district at the foot of the Himalaya, from Oude to Bhutan, and also in Ceylon. In some cases, however, it is not easy to distinguish between really wild herds and those descended from individuals which were once domesticated. The domesticated race is spread all over India, from whence it has been introduced into Egypt, Asia Minor, Italy, and elsewhere. The horns of the arna are of enormous size and vary considerably in shape in the two sexes. Thus, whereas in the male they are very massive, and directed largely upwards in a bold sweep, in the female they are more slender and in some instances point almost directly outwards, although in others they curve upwards in the usual way. In one imperfect skull in the British Museum the horns measure 12ft. 2in. from tip to tip along the curve, while two detached horns reach 6ft. 6in. each, thus indicating a tip-to-tip measurement of about 14ft. The typical arna is blackish-coloured, but there is also a fawn-coloured variety.

The dangers of buffalo-shooting on foot are graphically referred to in Sir Samuel Baker's "Wild Beasts and their Ways," where it is stated that the Ceylon race is even more ferocious than that of India proper. A full-grown bull stands upwards of 5ft. 4in. at the shoulder, and is a much larger animal

than his African cousin. In the above-mentioned pale-coloured variety from the Mishmi Hills the forehead of the skull is convex, and the nasal bones are much shorter than ordinary.

That the arna is a primitive inhabitant of India is proved by the occurrence of remains of a very large race in the gravels of the Narbada valley. Although the Narbada buffalo has been described as a distinct species (*Bos palæindicus*), it differs, except in the matter of size, so slightly from the living arna that it may be regarded merely as a race of that species. In the Siwalik Hills of Northern India we meet, however, with a fossil buffalo (*Bos platyceros*) of a totally distinct type. This fine buffalo forms a connecting link between the arna and the next species, the broad, triangular horns being more approximated on the forehead, and directed rather forwards than backwards, so that the forehead itself is nearly flat. Moreover, the horns are placed still further below the occipital plane of the skull than in the arna.

We also find in the Siwalik Hills remains of other long-skulled Buffaloes, such as *Bos occipitalis* and *B. acuticornis*, which are of smaller size, and characterised by the horns being more upright and so markedly triangular that in several specimens their cross-section is nearly in the form of an equilateral triangle, although in other cases it may be pear-shaped. The

skulls of these fossil species are indeed so like those of a small buffalo (*B. mindorensis*), now living in the Philippines, where it is known as the tamarao, as to suggest a close relationship between these animals. Although there has been some uncertainty whether the tamarao is really a distinct species, or, as Dr. Heller suggests, merely a dwarfed island race of the arna, which by degeneration has assumed a marked resemblance to the extinct ancestral types of buffalo, a specimen recently received by the Natural History Museum seems to leave no doubt as to its right to specific rank. While having the stout limbs of the arna, the tamarao is not much larger than the anoa, with which it agrees in the form and direction of the horns. The stoutness of the latter recalls, however, the Indian buffalo.

The last of the existing wild oxen is the diminutive anoa (*Bos depressicornis*) of Celebes. This animal is known to the Malays as the *sapi-utan*, a term which means wild ox, and in the Malay Peninsula is applied to the banting. It is the smallest of the wild oxen, being inferior in size to a small Highland cow, and differs from the other buffaloes in being an inhabitant of the mountains, although fond of swamps and marshes. The horns are comparatively long, with a triangular section at the base, where they are ringed, and they are directed straight upwards in the

plane of the face, with but a slight degree of divergence. The part of the skull situated behind the



FIG. 13.—YOUNG ANOA (from Guillemard's "Cruise of the Marchesa").

horns is, indeed, more like that of an antelope than that of a buffalo; the well-marked crest found on

the occiput of the true buffalo, as well as of the small extinct Siwalik species, being absent. The tail is of moderate length; and the general colour of the body is dark brown, but there are some spots of white below the eyes, as well as on the lower jaw, back and limbs. The hair, which in the young is moderately long and thick, tends to become much shorter and thinner with advancing age, thus showing another sign of affinity with the true buffaloes, in which the skin of the adult is nearly naked.

Here we may mention that the Javanese talk of a problematical animal under the name of the santeng, which has been considered to be a dwarf buffalo nearly akin to the anoa, although it is very remarkable that if such an animal exists it is unknown to naturalists. Possibly, however, it may have become extinct in comparatively recent times, since certain fossil skulls have been found in Java, which it is suggested may have belonged to the santeng. These skulls have been mentioned under the name of *Anoa santeng* in a paper published recently by Dr. Jentink, of Leyden.

Returning to the anoa, we may observe that the adult is very like a young buffalo, exhibiting characters connecting it with the antelopes, which are lost in the adults of the other species. Taken with the aforesaid extinct species of the Siwalik Hills, it

clearly shows us how the buffaloes may have originally descended from extinct antelope-like animals ; and from these early buffaloes the other types of oxen may easily have been evolved. The antelope-like features of the anoa are to be found in the structure of the hinder part of the skull, the upright direction of the straight horns, the spots on the body, head, and limbs, and the diminutive size ; while it resembles the buffaloes in the triangular section of its horns, in the short and sparse hair of the adult, the large naked muzzle, and the barrel-like form of the body.

VI.—MUSK-ox.

The musk-ox (*Ovibos moschatus*) is an animal which, as already mentioned, cannot be classed either with the oxen or sheep, although partaking so closely of the characters of the latter, that it should rather be called the musk-sheep. The horns are, however, at first sight so buffalo-like, that the animal is almost always popularly regarded as a member of the bovine group, and is accordingly noticed here. In size and general appearance the musk-ox recalls our smaller Highland cattle, although readily distinguished at a glance by the peculiar form of the horns and the coat of long brown hair covering the body, and hanging down nearly to the

feet. In its short tail, which is completely concealed among the long hair, and hairy muzzle, as well as in the structure of its grinding-teeth (which in the upper jaw are narrow, and have no additional column on the inner side), the musk-ox is, indeed, essentially a sheep. In old bulls the horns have yellowish, rugged, and flattened bases, meeting in the middle of the forehead, somewhat after the

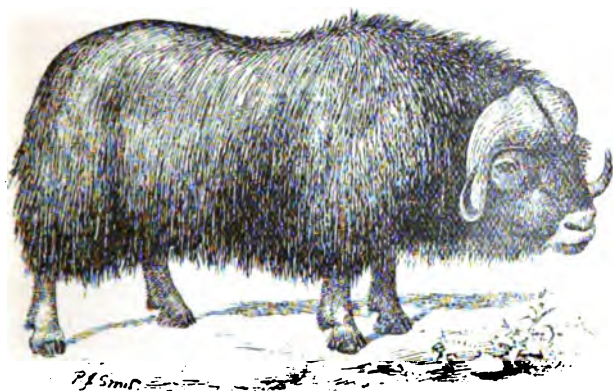


FIG. 14.—THE MUSK-OX.

fashion of those of the Cape buffalo; they then curve downwards, and afterwards upwards and forwards, becoming at the same time thin and cylindrical, and gradually darkening, till they terminate in black tips. In its "Roman-nosed" face the musk-ox likewise resembles the sheep, but its build is more massive, the head larger, the neck

shorter, and the limbs stouter and shorter, in all of which respects it simulates the oxen.

The musk-ox is an essentially Arctic animal, well adapted by its massive feet (of which the sole is in part hairy) for getting over the roughest ground with facility ; and associating in small herds, which do not usually comprise more than thirty individuals. At the present day it is confined to North America, beyond latitude 60 deg., being limited to the westward by the Mackenzie river, flowing from the Great Slave Lake, but extending northwards to Grinnell Land, in latitude 80 deg. 59 min., and eastwards to both shores of North Greenland. Its range seems, however, to be steadily becoming more and more restricted. Thus, it was formerly common in Alaska, skulls having been obtained by Captain Beechey during the voyage of H.M.S. " Blossom "—1825 to 1828—from the frozen deposits of Kotzebue Sound, in Behring Strait, and they have also been found on the upper part of the Porcupine river in Canada. Moreover, there is evidence that so late as 1770 musk-ox were living in the neighbourhood of Fort Churchill, on the west coast of Hudson Bay, in latitude 58 deg. 44 min. We can, however, scarcely credit the statement quoted by Cuvier, that in the early days of American history the Spaniards found this animal living so far south as latitude 40 deg. In

earlier periods of the earth's history, when the climate was doubtless colder than at present, musk-oxen, apparently belonging to an extinct species, ranged as far south as between latitude 35 deg. and 40 deg., their remains having been found in the States of Kansas and Kentucky. The range of the living animal was, however, by no means limited to the western hemisphere. Crossing Behring Strait, remains of these animals occur in the "tundras" of Siberia as far eastward as the Obi river, whence a skull was brought by Pallas. It doubtless ranged right through Russia, since we have evidence of its existence in Germany as far south as Würtemberg, from whence its range continues into France, as far to the southwest as the Dordogne. In the caves of that district it has been found, together with human remains, as well as those of the bison, reindeer, &c., thus suggesting the former prevalence of Arctic conditions in this part of Europe. The Pyrenees and Alps appear, however, to mark the southern limits of the range of the musk-ox, since its remains are unknown either in Spain or Italy. In England, however, skulls and other bones of this animal have been obtained at several places from superficial deposits containing remains of mammoth and other northern animals. These localities include Crayford and Greenstreet, near Bromley, in Kent; Maiden-

head, in Berkshire ; Trimlingham, in Norfolk ; Freshford, near Bath ; and Barnwood, near Gloucester ; while skulls have also been dredged up from the Dogger Bank in the North Sea.

The regions now inhabited by the musk-ox are of the most barren description, and their inhospitable nature seems to have precluded most sportsmen making expeditions for the especial purpose of musk-ox shooting. They have, however, been frequently killed by the officers of the various Arctic expeditions ; and several fine examples were recently shot by Lord Lonsdale. The Eskimo hunt the musk-ox with specially-trained sleigh dogs.

CHAPTER II.

WILD SHEEP.

FEW animals are more eagerly sought after by the hunters of "big game" than wild sheep—in the first place, because the magnificent and gracefully curved horns of the larger species are among the finest trophies that can reward the labours of the sportsman; and secondly, because the pursuit of these animals, owing to the difficult nature of the ground which many of them inhabit, coupled with their extremely keen sense of smell and sound, demands all the skill and patience the sportsman can summon to his aid.

These animals are likewise of not less interest to the zoologist, as forming, with their near allies the goats, one of the most specialised groups of the great family of hollow-horned ruminants, or *Bovidae*. Although presenting some resemblances to the oxen in certain features of the skull, such as the small size or absence of the crumen or "tear-bag," and the usual presence of horns in both sexes, both the

sheep and the goats are widely different from the last-named group as regards the contour and ornamentation of their horns, and still more so as regards the structure of their grinding or cheek-teeth. The latter are of a very narrow form, the hinder ones in the upper jaw having no additional inner column standing up between the two main columns, as we may readily satisfy ourselves by the examination of a sheep's head. In this respect sheep resemble the gazelles and some other allied antelopes, whereas in the oxen, as mentioned in the preceding chapter, the upper grinding-teeth have nearly square crowns, in which there is a very large additional column on the inner side. Since certain antelopes, like the gemsbok and the sable antelope, have teeth of the same type as those of the oxen, the suggestion naturally presents itself that, while sheep and goats may have been derived from antelope-like animals allied to the gazelles, the oxen may trace their descent to a group more nearly related to the gemsboks. Support is afforded to this idea by the circumstance that, while antelopes are the oldest hollow-horned ruminants with which we are acquainted, sheep, goats, and oxen are the latest representatives of the whole group, being met with only in the highest geological formations, and not attaining their maximum of development till the

present epoch. All species of sheep have glands in both hind and fore feet, whereas in the goats these glands, if present at all, occur only in the fore feet. In the oxen they are invariably absent. The absence of a true beard on the chin, and also of a strongly marked odour in the males of sheep, are important points of distinction from the goats. In the more typical species of sheep, the horns are triangular, and marked by parallel transverse wrinkles, extending completely round them ; their first curve being directed downwards and forwards, and the second curve turned outwards ; while their colour is either light brown or greenish-brown. Certain species of sheep, however, such as the bharal of Tibet, present so marked an approximation to the goats in the structure of their horns, as well as in some other features, that it is extremely difficult, if not impossible, to draw up a concise definition between the two groups so far as these points are concerned.

So closely related, indeed, are the sheep to the goats, that Mr. Wallace, in his well-known "Geographical Distribution of Animals," has proposed to include the whole of them in a single genus—the genus *Capra* of Linnæus. This view has not, however, commended itself to the majority of zoologists, who class all the sheep in the genus *Ovis* ; their division into four genera, adopted by the late Dr.

Gray, not having met with general acceptance. In this respect, therefore, zoologists and sportsmen are for once in accord, the animals respectively included by the former under the generic terms *Ovis* and *Capra*, being nearly the same as those which are severally designated as sheep and goats by the latter. And although, as already mentioned, some of the more aberrant species of sheep approximate to the goats in several respects, yet neither zoologists nor sportsmen find any practical difficulty in deciding to which group any species brought for the first time under their notice should be referred.

Having premised thus much as to the relationship and affinities of sheep to other hollow-horned ruminants, we proceed to the consideration of the various species of wild sheep at present known to exist. Herein, however, we enter a subject of very considerable difficulty, and one in regard to which scarcely any two writers are in complete accord. This difficulty is due in great part to the marked general similarity of the more typical forms of sheep, thus rendering it in many instances difficult to decide whether we should consider slight differences as indicating distinct species, or merely as local races; but it has been enhanced by the practice of describing so-called new species on the evidence of single specimens. Puzzling as the

confusion and uncertainty has been to the professed zoologist, it is doubly so to the sportsman, who in many instances has neither the opportunity nor the leisure to consult the extensive literature of the subject; while, even if he does so, he is more than likely, owing to the contradictory opinions expressed, to throw up the whole matter in disgust.

Under these circumstances it cannot fail to be of interest to all those who are in any way acquainted with the subject to endeavour to determine approximately the number of well-defined species, giving at the same time some of their leading distinguishing features.

With regard to the geographical distribution of wild sheep, which first claims our attention, it may be observed that the whole of these ruminants are essentially mountain animals; and that they are mainly characteristic of Europe and Central Asia, with some of the adjacent regions, being especially numerous in the highlands of Central Asia. They are quite unknown in lower Peninsular India; in Africa, south of the Sahara; in South America, and, of course, in Australia. In Europe they occur in the mountains of Corsica and Sardinia; one species is found in Cyprus; and they inhabit Asia Minor, Persia, and Central and North-eastern Asia, ranging as far north as Kamschatka, and as far east as

Pekin. A peculiar species is a native of Algeria and other parts of North Africa; while a more typical one is found in the Rocky Mountains and on the coast of California, as well as in Alaska.

In treating of the various species it will be more convenient to take them according to their mutual relationships, rather than according to their geographical distribution.

Sheep may be roughly divided into four main groups, viz., (1) the bighorns of North America and Kamschatka; (2) the argalis of Central Asia; (3) the urials of Asia and the moufflons of Asia Minor and Europe; and (4) the bharals, as represented by the true bharal of Little Tibet and the Barbary sheep of North Africa. Following this grouping, we shall commence our survey with the bighorns.

I.—BIGHORNS.

The bighorn (*Ovis canadensis*) is the typical and best-known representative of the first group, being one of the kinds of "big game" found in the "Rockies" most sought after by sportsmen. It is likewise noteworthy as being one of the few representatives of the hollow-horned ruminants inhabiting the American Continent. This fine sheep—assuming that all the American specimens are

rightly referred to a single species—ranges over the whole of the Rocky Mountains, as far south as New Mexico, and is also found in the mountains of British Columbia and California, as well as in Alaska.

The most distinctive character of the bighorns is



FIG. 15.—HEAD OF KAMSCHATKAN BIGHORN (from Guillemard's "Cruise of the Marchesa").

to be found in the horns, which, while rivalling those of the Himalayan argali in size, are at once characterised by the slight development of the transverse wrinkles on their anterior surface, and by the great prominence of their outer anterior angle,

and the rounding off of the inner angle. The skull is also characterised by the extremely shallow depression below the eye—technically known as the lachrymal fossa—in which rests the gland termed the crumen, larmier, or “tear-bag.” In this respect, as well as in their comparatively smooth horns, the bighorns present some approximation to the goats; although in the bold circular sweep of their horns they agree with the most typical sheep. The buttocks have a large disc of a dirty white colour, extending on each side of the tail, which is very conspicuous, except in the summer coat of very old rams, when nearly the whole of the body is very pale-coloured. Portions of the lower part of the hind legs are also white. According to Colonel Biddulph,* the horns may attain a length of 40 in. along the curve.

From the observations of the last-named writer, it appears that there are two well-marked races or varieties of the bighorn, one inhabiting the southern, and the other the northern portion of its distributional area. There has been a question whether these two varieties should not be allowed to rank as distinct species; but since there are indications of some more or less intermediate forms,

* *Proc. Zool. Soc.* 1885, p. 678.

it is probable that the generally accepted view is the correct one.

The southern race is distinguished by its more massive horns, with the tips blunt, generally broken, and directed forwards, instead of being sharp, generally entire, and inclined outwards. The ears are also large, broad, pointed, and deer-like, with a moderate coating of hair; whereas those of the northern race are small, thickly-furred, and blunt at the points. Again, the southern race, in accordance with its massive horns, is also distinguished by its larger skull. Moreover, it does not appear that the southern race ever assumes the very dark winter coat of the northern form; and there are slight differences in the coloration of the legs. In the northern race, the hair between the ears at the back of the horns forms a long tuft, as in the Kamschatka sheep.

The bighorn is frequently known under the name of *O. montana*; but, always assuming that we are dealing only with a single species, the correct name, as pointed out by Colonel Biddulph, is undoubtedly *O. canadensis*.

Numerous accounts have been published of the habits of the bighorn, to which we need not further refer, as they appear to be mainly similar to those of the other large species, although the bighorn frequents more precipitous ground than the argalis.

The Kamschatkan bighorn, or sheep (*O. nivicola*), the only other representative of the first group, is closely allied to the true bighorn, its points of distinction having been indicated by Dr. Guillemard* and Colonel Biddulph. According to the former writer, this species is abundant on the east coast of



FIG. 16.—SKULL OF KAMCHATKAN BIGHORN (from Guillemard's "Cruise of the Marchesa").

Kamschatka, about fifty miles to the north-east of Petropaulovsky, although it was not found in other parts of the country. As might have been expected, it comes closer to the northern than to the southern race of the American bighorn, as is shown by the

* *Proc. Zool. Soc.*, 1885, p. 675.

comparatively slender horns, in which the points are sharp and turned outwards. (Dr. Guillemard figured a skull of the southern race of the bighorn for comparison with *O. nivicola*, and then considered that the two species might be distinguished by the horns alone.) Both also have the comparatively small skull and the long tuft of hair behind the horns. The ears of *O. nivicola* are as small as those of the northern bighorn, but their tips are rounded instead of blunt. The white disc on the rump is smaller than in the American species, and does not extend above the tail; while there is no trace of the stripe down the back, which is more or less conspicuous in the latter.

It thus appears that the characters distinguishing the Kamschatka sheep from the northern bighorn are of very trivial import; and since we have an almost complete transition from the southern to the northern bighorn, and thence to *O. nivicola*, it would not be an unreasonable view to consider all the three forms as local races of one species which was formerly widely spread; the long isolation of the Kamschatka form having produced certain peculiarities of coloration not found in the American types. If this view be not accepted, it would appear that, strictly speaking, we ought to regard the northern and southern bighorns as indicating

two distinct species; but since the line between what we term species and varieties is after all in great part, or entirely, a matter of convenience, it will, on the whole, be preferable to continue to regard the Kamschatkan sheep as a distinct species of bighorn.

Since Dr. Guillemard's party were fortunate enough to bag no less than thirteen full-grown rams in two days, we may infer that *O. nivicola* is by no means so wary in its habits as are most of the other large sheep.

II.—ARGALIS.

With the magnificent Pamir, or Marco Polo's sheep (*Ovis poli*), we come to the first and finest of the argalis, which differ from the bighorns by the strongly marked transverse wrinkles on the massive horns, in which the outer anterior angle is less prominent, and also by the deeper lachrymal pit in the skull. This splendid sheep, the second largest of the genus, inhabits the elevated plateau of Central Asia, generally at an elevation exceeding 9000ft., extending over the Pamir, across the Thian Shan range to the Semiretchinsk Altai, and being comparatively abundant to the north of Kashgar. It is only of late years that we have become fully acquainted with this animal, and unfortunately it

has already received several names; the forms described as *O. karelini*, together probably with those which have received the names of *O. sculptorum* and *O. heinsi*, being really not specifically separable.

The height of adult specimens of the typical form is upwards of 4ft. at the withers. The horns of the rams describe about a circle and a quarter when seen from the side, and are known to attain the enormous length of 63in. along the curve, and have been stated to exceed 70in. In winter the general colour is greyish-brown, with a darker stripe on the back, whitish below, and with a more or less well marked whitish disc on the rump, the legs being also white. In summer the colour becomes dark brown. There may be a dark line on the flanks separating the brown from the white area. The throat has a short mane.

We are indebted to Mr. Blanford for showing that *O. karelini* is not really distinct from this species; a series of eleven skulls compared together by this writer indicating that the alleged differences in the curvature of the horns are merely individual, and that a complete transition can be traced between the extreme modifications. Mr. Blanford then proceeds to discuss the other alleged differences between these two forms, and as his observations

are of great interest and importance, they may be quoted at length. He observes: "In *O. poli* the horns are pressed in from the sides, especially the orbital surface. In *O. karelini* the orbital surface is flat, the frontal surface very convex. In the first-named all the edges are rounded; in the latter, all with the exception of the fronto-nuchal. The details given by Messrs. Brooke show that these distinctions are not constant. In both forms surfaces and edges grow more rounded in older individuals. Precisely the same conclusions may be drawn from the series exhibited. In *O. karelini* the axis of the terminal portion of the horn is parallel with the axis of the basal portion. In *O. poli* the axis of the terminal portion diverges more from the skull than that of the basal portion. This difference depends entirely on the degree of divergence, which is shown to vary and to pass by insensible gradations from one form to the other. In *O. karelini* the horns are said to form a spiral that would fit on a cone with the base towards the skull; in *O. poli* the base of a cone on which the horns would fit is away from the skull. I doubt if this character is of any importance; it is not noticed by Sir V. Brooke. If there be any distinction, it, like the last, probably depends on the degree of divergence of the horns. In *O. poli* the horn is

more than four times the length of the skull; in *O. karelini* only three times as long. But in some of the specimens of the latter, measured by Messrs. Brooke, each horn was more than three and a half times the length of the skull; and in the heads exhibited, horns having the curve of *O. karelini* are 63in. in length, or more than four times as long as any skull measured. The only conclusion to which



FIG. 17.—HEAD OF PAMIR SHEEP.

I can come is, that there is no constant difference of specific value between *O. karelini* and *O. poli*." The variety *O. karelini* inhabits the Thian Shan range; and it is highly probable, as already said, that the sheep from the same regions to which the name *O. heinsi* has been applied is not really distinct.

Marco Polo's sheep inhabits the extensive grassy

slopes so characteristic of the Pamirs, where food is abundant, and all of which are situated at a great elevation. In the Altai it is, however, said to occur at elevations of between 2000 and 3000 feet in summer, and to descend to considerably lower levels in winter. On the Pamirs these sheep are found in flocks, often of considerable magnitude. In the Turki tongue the rams are called "galja," and the ewes "arka." The two Englishmen who have been most successful in stalking these sheep are Mr. St. George Littledale and Major C. Cumberland. To the former the country is indebted for the magnificent series of specimens mounted in the Natural History Museum; while the latter has furnished us with an excellent account of the *shikar* of these sheep in *Land and Water* for 1891.

The argali (*O. ammon*), or typical representative of this group, appears to have occurred formerly in the Altai, but is now restricted to Northern Mongolia. The horns are more massive than those of *O. poli*, but are shorter and only form about four-fifths of a circle, the blunt and generally broken tips being inclined outwards. Those of old rams may have a circumference of some 22in. at the base, and probably attain a length of 50in. The skull differs from that of the Pamir sheep by the space between the horns being hollow, instead of flat.



FIG. 18.—HEAD OF ARGALI.

The height at the withers is usually something below 4ft. The specimen mounted in the Mammalian Gallery of the Natural History Museum has no white disc on the rump, and the throat is not provided with a distinct fringe. The horns, as shown in Fig. 18, measure $47\frac{3}{4}$ in.

Owing to the inaccessibility of the country inhabited by the argali, our museums are still but poorly supplied, either with stuffed specimens or heads. The name *Ovis argali* is a synonym of this species.

The maned sheep (*O. jubata*), from the country to the northward of Pekin, is a little-known species or variety allied to the preceding and following forms. Judging from its specific name, it would appear to come closer to the latter, as having a fringe of hair on the throat; but on distributional grounds it might rather be referred to *O. ammon*. The sheep named *O. nigrimontana* is probably identical with the argali.

Hodgson's sheep (*O. hodgsoni*) the *Ovis ammon* of Indian sportsmen, the Nyan of the Tibetans, is the best-known representative of the argali group, and is so closely allied to the true argali that, in the writer's opinion, it is very doubtful whether it has any real right to be reckoned as a distinct species, although it inhabits a completely isolated

area. The male is of a dark brown colour, somewhat lighter on the belly, and with a lighter patch on the rump; the throat is fringed with a ruff of long hairs, which are whitish in the male, and brown in the female. The horns, which are said to attain a length of 48in. in one specimen, appear to be precisely similar to those of the argali. Indeed, on comparing the two stuffed specimens of *O. ammon* and *O. hodgsoni*, standing side by side in the Natural History Museum at South Kensington, the only apparent difference between the two is the small lighter disc on the rump, and the hairy fringe on the throat of the latter. Dr. Gray (who certainly did not err on the side of "lumping" species), in his "Catalogue of Ruminant Mammals," published by the British Museum in 1872, when treating of Hodgson's sheep, which he names *Caprovis bambhera*, and incorrectly terms the bharal, quotes from Mr. Sclater to the effect that it is believed to be "not yet quite certain that this magnificent sheep is identical with *O. ammon* (*argali*) of Siberia." The slight differences mentioned above certainly seem of racial rather than specific importance; and it is, therefore, not improbable that we ought to regard Hodgson's sheep merely as an isolated and local race of the argali. This view was ultimately adopted by Blyth.

This sheep inhabits the Tibetan Himalaya, at elevations of about 15,000ft. and upwards, but its northern limits are not yet fully defined. In the greater part of Ladak it appears to be unknown on the south of the Indus; its favourite haunts being the neighbourhood of the great Pangong Lake, the Changchenmo valley, and thence into Chinese Tibet; further eastward it is met with in the Satlej valley, beyond the Niti Pass.

When the writer was last in the former regions—about fourteen years ago—adult males of Hodgson's sheep were but rarely met with, although large flocks of young rams and females were not uncommon, and could be easily approached. An admirable account of the pursuit and habits of this sheep will be found in General Kinloch's "Large Game of Thibet"; but the writer would add that full-grown rams are not invariably so wary as there represented. Thus he well recollects going out from his camp in the Changchenmo valley at dawn on an August morning (when a slight frost was on the ground), and, after proceeding about half a mile, sitting down to watch a pass some 2000ft. above the level of the valley. After waiting a short time, just as the sun rose, four individuals of this sheep—an adult ram and three ewes—topped the pass, and stood clear out against the sky. Soon they commenced the

descent, and gradually fed their way down the pass, until they came within some fifty yards of the rock behind which the writer lay concealed, the ram presenting an easy broadside shot, which was handsomely missed.

III.—URIAL AND MOUFLON.

The so-called sha (*Ovis vignei*) of the upper Indus valley in Baltistan and Ladak brings us to the first representative of the group of smaller and more slender-horned sheep.

In Tibet this sheep ranges from about 12,000 to 14,000ft. in elevation. The horns in this group, although strongly wrinkled, are much more slender and more compressed from side to side than those of the argalis; while their outer, or antero-external edge is never so prominent as in the latter, and may be more or less completely rounded off. In the variety found in the Punjab, where it is known by the name of urial, the horns tend, when complete, to form an entire circle. The skull has a well-developed lachrymal pit; and there is a large crumen, or tear-bag.

The sha stands about 3ft. at the withers; and the horns of the ram average from 25in. to 30in. in

length. The general colour is brownish-grey, the belly being white; and the throat is fringed with a short beard of stiff brownish hair.

The horns were described by Mr. Sclater in the "Proc. Zool. Soc." for 1860, as being somewhat compressed laterally, rounded posteriorly, curving outwards and backwards from the skull, with the tips divergent; this description being quoted by almost all subsequent writers. An inspection of his figure will, however, at once show that the horns of the specimen from which this description was taken are not good examples, many heads showing horns with a much greater curvature, and thus approximating closely to those of the true urial.

There has been much discussion as to whether this Tibetan sheep is specifically distinct from the Punjab urial. General Kinloch, who was one of the first to consider the two as being nothing more than local races of a single species, makes the significant remark, that while the sha inhabits the Upper Indus valley, extending down as far as Baltistan, the true urial is found on the Lower Indus in Hazara. When, therefore, we recollect that the whole of the Indus valley between Hazara and Gilgit (somewhat below Baltistan) is totally unknown, the probability naturally suggests itself that there may occur in this area a race of sheep intermediate between the sha

and the true urial. This question has, however, been now practically decided by Mr. Blanford, who, in his "Mammals of British India," finds that in a large series of specimens it is quite impossible to distinguish between the horns of the two forms, which



FIG. 19.—PERSIAN URIAL. (After Churchill.)

must consequently be regarded merely as varieties of a single species (*O. vignei*).

The smaller true urial, commonly known as *O. cycloceros*, inhabits the Salt Range of the Punjab, the Suliman Range, the Hazara Hills, and the

neighbourhood of Peshawur, from whence it ranges through Sind and Baluchistan into Eastern Persia, where its occurrence has been recorded by Mr. Blanford. The horns do not usually appear to exceed 30 in. in length, and are generally more compressed and less rounded posteriorly than in the true sha, and have a smaller basal girth, and a slight difference in the curvature. The ruff fringing the throat is usually more abundant, and generally consists of a mixture of black and white hairs. Mr. Blanford, in his "Eastern Persia," makes the noteworthy remark that the horns of the Persian specimens of the urial are more like those of sha than those of the Punjab form; and Mr. Sydney Churchill, who has had the opportunity of observing a number of these sheep at Tehran, writes us that while some adult Persian rams have a well-marked ruff on the throat, others—at least up to three years of age—are totally devoid of this appendage.

To those who do not care to undertake the long journey, and to endure the hardships inseparable from the pursuit of the wild sheep of the higher Himalayas, urial stalking offers a much more accessible and less fatiguing kind of sport. Urial are abundant in the low hills within a few days' march of the town of Jhelam, in the Punjab, and the writer has enjoyed several days' good sport

among them, without leaving the track marked out by his official duties in the service of the Indian Government. An interesting account of this kind of "shikar" is given by General Kinloch in the volume to which reference has already been made. The urial is noteworthy as being the sheep which inhabits a hotter area than any other member of the genus.

With regard to the so-called Blanford's sheep (*O. blanfordi*), described by Mr. Hume from a skull obtained at Kelat, in Baluchistan, recent observations show that it should likewise be regarded as a variety of the urial. Its horns differ from those of the ordinary urial in being longer (35·7 in.), and relatively more slender, and form a more open curve, twisting outwards somewhat after the manner of the letter S. Mr. Sclater exhibited to the Zoological Society in 1887 a pair of horns from near Attock, on the left bank of the Indus, which, although of unusually large size, he referred to the urial, remarking that they "appeared to belong to the form described by Mr. Hume as *O. blanfordi*." This is confirmed by Mr. Blanford in his "Mammals of British India," where this Baluchistan sheep is decided to be merely a local race of the urial.

The Armenian, or Gmelin's sheep (*O. gmelini*)—also known as *O. orientalis*—is a well-characterised

species inhabiting Eastern Persia and Asia Minor, being especially common in the Cilician Taurus. The general build is deer-like and graceful, the limbs being relatively long and slender; the lower part of the throat of the male has a thick bushy fringe, and the females differ from those of any of the preceding species in being destitute of horns. In the rams the upper parts of the body are russet-yellow, the under parts of the belly and legs white, the fore portion of the face whitish, and a dark line on the chest, and a dark mark above the knee in the fore-leg; the females having a characteristic white saddle-mark. The male stands about 33in. in height at the shoulder, and is thus about the same size as the urial. The horns, which have a characteristic curvature, do not usually exceed some 26in. in length, but there is one enormous pair in the Natural History Museum, mentioned by Messrs. Danford and Alston, and said to be "from an island in the Mediterranean," measuring upwards of 40in. As a rule, the three edges of the horns are well defined, so that a transverse section would be triangular, and their points are bent downwards. In one specimen from the Cilician Taurus, described by Messrs. Danford and Alston, the characters of the horns are, however, very similar to those of the Cyprian sheep.

It is said that in winter these sheep can be easily stalked; but that at other seasons, owing to the want of cover, they are very difficult to approach.

The Cyprian sheep (*O. ophion*) is a smaller form, confined to the island of Cyprus, so closely allied to the preceding that Sir V. Brooke considered that it should only be regarded as an insular race of the same. The males stand just over 26in. at the shoulder, their horns attaining a length of some



FIG. 20.—HORNS OF CYPRIAN SHEEP. (After Biddulph.)

23in. The horns are more slender than in typical specimens of the Armenian sheep, and their wrinkles less marked; the anterior external edge being so rounded off as to be almost obliterated, and their tips directed upwards. The general coloration is very similar to that of the Armenian sheep, but there appears to be a much more distinct dark line

dividing the rufous of the sides from the white of the belly, and the fringe on the throat is less developed.

The above-mentioned variety of *O. gmelini* tends to show that the Cyprian sheep has been directly derived from the latter, but that its long isolation has diminished its size, and induced certain external variations, which may perhaps entitle it to rank as a species.

According to Colonel Biddulph,* these sheep are confined to the Troodos Mountains, in the western central portion of Cyprus, in which the highest peak rises to a height of 6590ft., where they roam over a large area of pine-clad upland.

The mouflon (*O. musimon*) of Sardinia and Corsica is the last representative of this group, and the only wild European representative of the genus. Although now confined to the two islands mentioned, it is said to have formerly occurred in the south of Spain, but this is doubtful. It is a small species of a brownish-grey colour, with a dark streak down the middle of the back, and a variable amount of white on the face and legs. The horns, which are present only in the males, curve inwards at their tips, and have the wrinkles much finer than in the urial.

* *Proc. Zool. Soc.* 1884, p. 593.

Their curvature is very different from that of the Armenian sheep, as is also the coloration of the fur; while the fringe on the lower part of the throat is more developed. An excellent account of mouflon shooting is given by Mr. E. N. Buxton in "Short Stalks," where the extreme shyness of the animal is mentioned.

IV.—BHARAL AND BARBARY SHEEP.

With the Himalayan bharal (*O. nahura*) we come to the first of two very remarkable and aberrant species connecting the typical sheep with the goats. In both the horns are comparatively smooth, of a blackish-brown colour, with the extremity of the first curve directed backwards and upwards. In the skull there is no lachrymal pit, and there is no crumen or tear-bag on the face, both these features being characteristic of the goats. The tail is also longer than in other sheep.

It was once thought that there were two species of bharal (*O. nahura* and *O. burrhel*), but it is now known that there is but one. This sheep has a wide range, occurring from Sikhim to Ladak, and thence north to the Altyn-tagh, south of Lob Nor. The males stand from 30in. to 36in. in height, the horns averaging from 24in. to 30in. in length, and the

length of the tail being 7in. The general colour is a dark, slatey blue (whence the name of blue sheep), with the belly, part of the buttocks, and the upper part of the tail white, and the throat, chest, the front of the legs, the tip of the tail, and a line on the flanks deep black. There is no distinct mane on the throat and chest, and the tail is likewise devoid of long hairs.



FIG. 21.—HEAD OF BHARAL.

For a full account of its habits, and the difficulties of stalking the bharal, the reader may consult General Kinloch's well-known book. In the less-frequented regions of Ladak bharal are by no means difficult to approach. On one occasion, in the month of August, when riding down a pass on the south

side of the great range of mountains on the left bank of the Indus, opposite the town of Leh, the writer came upon five bharal lying asleep in the pathway. Three out of the five fell to a Martini-Henry, the skull of one, which is an unusually fine specimen, being now exhibited in the Natural History Museum.

The Barbary sheep (*O. tragelaphus*) is the last species that remains for consideration. This sheep is generally known as the aoudad, but, according to Mr. E. N. Buxton,* this name is not recognised in Algeria, where it is termed the arui.

Although agreeing with the bharal in the general characters of its skull and horns, both as regards contour and colour, this fine sheep, which attains a height of over 3ft., is at once distinguished by the profuse mass of long hair which forms a fringe on the throat, chest, and fore legs, as well as by the longer and somewhat hairy tail. The coloration is also markedly different, the black points and lines of the bharal being absent. The horns do not appear to exceed 24in. in length.

We are indebted to Mr. Buxton, who appears to be the only Englishman who has successfully stalked the Barbary sheep, for the best account extant of its

* *Proc. Zool. Soc.* 1890, p. 361, and "Short Stalks."

habits. Taken in connection with the caprine affinities to which allusion has been already made, Mr. Buxton's remarks as to the similarity between the habits of this sheep and those of the Pyrenean wild goat are very significant. These animals range over the more precipitous regions of the arid southern slopes of the Atlas Mountains from the Atlantic to Tunis. They appear to be unknown in the interior of the mountains nearer the coast, and seem to keep within sight of the desert. These sheep are extremely difficult to find, the reason for this, according to Mr. Buxton, being "the extraordinary capacity for hiding itself shown by the arui, in which it is assisted by its own nearly invisible colour, which is a pale rufous-yellow, and by the extremely broken character of the rocks, which, being for the most part of soft limestone, readily decompose, and are cut into numerous fantastic hollows and fissures, and are covered in many places with a rather extensive growth of scrubby thuya bushes."

As the result of our survey we arrive at the conclusion that, although some of the so-called species of wild sheep which have been described of late years are certainly not entitled to take this rank, yet that there is still considerable uncertainty as to the real number of valid species. If we take all the species provisionally adopted in the foregoing para-

graphs, we shall have a list of twelve in number, viz.:

1. The bighorn (*O. canadensis*).
2. The Kamschatka sheep (*O. nivicola*).
3. The Pamir sheep (*O. poli*).
4. The argali (*O. ammon*).
5. The maned sheep (*O. jubata*).
6. Hodgson's sheep (*O. hodgsoni*).
7. Urial (*O. vignei*).
8. The Armenian sheep (*O. gmelini*).
9. The Cyprian sheep (*O. ophion*).
10. The mouflon (*O. musimon*).
11. The bharal (*O. nahura*).
12. The Barbary sheep (*O. tragelaphus*).

If, however, *O. nivicola* be only a variety of the bighorn, while *O. hodgsoni*, and perhaps also *O. jubata*, are inseparable from *O. ammon*; and if *O. ophion* be merely a local race of *O. gmelini*, then the list may be more or less reduced, the lowest estimate giving us only nine species.

With this wide margin of possible contingencies we see how imperfect our knowledge of this group of mammals still remains.

CHAPTER III.

WILD GOATS.

IN the preceding chapter allusion was made to the eagerness with which the heads and horns of wild sheep are sought as sporting trophies, and it might have been safely asserted that the appreciation in which these trophies are held extends to the larger and handsomer wild goats, such as the ibex and markhor, whose horns form some of the most striking objects of this class. Most of the wild goats have long been more or less familiarly known to us, although there has till recently been much confusion as to the number and range even of the European species, and the question does not yet appear to have been finally set at rest.

In the same chapter it was also shown how closely the goats are connected with the sheep, and how extremely difficult it is to draw up any set of well-defined characters by which the one group can be distinguished from the other. Further study has tended to emphasise the closeness of this relation-

ship ; and the manner in which the goat-like sheep, such as the bharal and Barbary sheep, graduate almost insensibly into the sheep-like goats of the Caucasus, suggests the advisability of regarding both sheep and goats as members of a single genus. Nevertheless, as a matter of convenience, we may continue to separate the various species of sheep under the title of *Ovis*, while we restrict that of *Capra* to those goats which have long horns.

Adopting, then, this dual grouping, let us see how the members of the one group may be distinguished from those of the other. And here it may be remarked that, as in other instances, there is no difficulty in distinguishing a typical goat from a typical sheep — no one, for example, having any hesitation in distinguishing an ibex from an argali. The difficulty comes in when we have to deal with what are called the aberrant or connecting forms. As a general rule, the goats are characterised by their horns being more or less flattened from side to side, and either sweeping backwards in a bold, scimitar-like sweep, or being more or less twisted in a spiral manner. The face of the goats has no crumen or tear-bag, which is usually (although not invariably) present in the sheep ; and whereas all sheep have pores or glands between the hoofs of each foot, in the goats such glands are found only

in the fore feet, and even there may be wanting. In this connection, I may remark in passing, that the late Mr. Blyth pointed out the importance of this character as a means of distinguishing a hind-quarter of goat with the foot attached from that of a sheep, and of thus defeating the frequent attempts of Indian butchers to palm off goat-flesh for mutton. Another distinctive feature of almost all goats is the presence of a larger or smaller beard depending from the chin of the males, to which may be added the very characteristic "goaty" odour of that sex. In addition to their generally compressed form, the horns of the goats are usually angulated, and often carry strongly-marked thick ridges on the front, as is well shown in the figure of the ibex given later on.

Like the sheep, the wild goats are essentially mountain animals; but whereas many of the former are found on more or less open ground, like the plateaus of Tibet and the Pamirs, most of the goats restrict themselves to more rocky regions, many of them inhabiting ground on which few other animals can find a footing. In this respect they are, indeed, equalled by the group which includes the European chamois, the Indian serow and goral, and the Rocky Mountain goat (which is not, however, a true goat)—that group forming a connecting link between the goats and the antelopes. The

Himalayan ibex is, however, found on the Pamir, although we have yet to learn whether it inhabits the open districts in which the argali dwells.

We have seen that, with the exception of the North American bighorns, the sheep are essentially Old World animals, being mainly characteristic of Europe and Asia, and unknown in Africa except in the extreme north. The goats (always excluding the Rocky Mountain goat) have not a single out-lying American species, and are thus an exclusively Old World group, frequenting, to a great extent, the same regions as the sheep, and being represented in Africa only by two species respectively inhabiting parts of Abyssinia and Egypt. They differ from the sheep, however, in that they are represented by an aberrant species in the Nilgiri and Anamalli Mountains of Southern India; whereas in India sheep are totally unknown south of the Himalaya and the Punjab Salt Range. Exclusive of this South Indian species, the goats range over all the higher mountains of Southern Europe—both continental and insular—from Spain to the Caucasus; they likewise occur in Abyssinia and Egypt, and are again met with in Persia, Sind, Baluchistan, and thence through the Himalayas to Tibet, and so on to the Altai and Sayansk Mountains separating Mongolia from Siberia.

In regard to the number of species, the goats likewise resemble the sheep, the actual number being somewhere about twelve. Moreover, both groups agree in the lateness of their appearance upon the earth, no representatives of either being known before the Pliocene or later Tertiary geological period. At that epoch, fossil goats allied to species now living in the Himalaya existed in the Punjab and Siwalik Hills of Northern India; while in the succeeding or Pleistocene epoch, remains of ibex are found in the plains of Central Europe. The latter circumstance is very important in regard to the explanation of the distribution of the existing European species of ibex, since it shows that these animals were driven down from the mountains by the intense cold of the glacial period, and as the climate again ameliorated ascended whatever mountain chains were then nearest to them. This will account for the presence of nearly related species in the Pyrenees and the Caucasus, and of others in the Alps and the Sinaitic peninsula.

As is the case with nearly all mammals, very different views have been entertained by different naturalists as to the classification of the goats, some authorities (like the late Dr. Gray) placing them in several genera, while others include the whole, or most of them, in the genus *Capra*. As the latter

view is the one now entertained by most English zoologists, it will be adopted here, and all of the species except two are placed in that genus. It will, however, be found convenient for descriptive purposes to arrange the goats under several distinct groups, although it will, of course, be clearly understood that these pass more or less completely into one another. These groups are as follows, viz.: (1) Ture; (2) Pasang, or true goats; (3) Ibex; (4) Markhor; and (5) Tahr; the last group forming a distinct genus.

I. TURE, OR SHEEP-LIKE GOATS.

The ture of the Caucasus and the so-called Spanish ibex are those species which connect the goats with the sheep, and are, therefore, properly placed at the commencement of the caprine series, as following after the bharal and Barbary sheep with which the chapter on wild sheep concluded. So similar, indeed, is one of the ture to the bharal that, in the Natural History Museum, it is actually called the Caucasian bharal. If, however, the goats and the sheep are referred to two distinct genera, this name would be better discarded, as its use is liable to lead to confusion. Ture are characterised by

their nearly uniform coloration, and by the beard of the male being relatively small, although sometimes long. Their horns are more or less rounded and conical, and curve to a greater or less degree outwards and backwards, often having a spiral tendency. Frequently they lack the bold bosses or knobs on the front surface, which are so characteristic of those of the ibex; and these are never so bold as in the latter; nor have the horns ever the same long scimitar-like form.

Ture occur typically in the Caucasus range, and when Mr. Sclater* wrote on wild goats in 1886, he considered that there was but a single Caucasian species, for which the name *Capra caucasica* was adopted. In a second memoir† however, he concluded that there were two well-marked species of ture in the Caucasus, respectively known as *C. caucasica* and *C. pallasii*, and severally inhabiting the western and eastern portions of that range. But the matter did not rest here, for in the latter part of the same year Dr. Menzbier‡ came to the conclusion that the true *C. caucasica* was confined to the central Caucasus, and that the western form belonged to a new species, for which he proposed

* *Proc. Zool. Soc.* 1886, p. 313.

† *Ibid.*, 1887, p. 552.

‡ *Ibid.*, p. 618.

the name *C. severtzowi*. According to these writers, the three forms of Caucasian ture are distinguished as follows. The first of these is Pallas's ture (*Capra cylindricornis* = *C. pallasii*), of which there are two fine specimens in the Natural History Museum. It inhabits the Caucasus west of Kasbeg and the whole region of Daghestan. It may be described as a goat with bharal-like horns. These horns, of which a fine pair are shown in Fig. 22, are black, nearly cylindrical, are directed backwards and outwards



FIG. 22.—HORNS OF PALLAS'S TURE.

in a somewhat spiral manner. Their tips are directed inwardly, and come near together, so that in some specimens they are not more than a foot apart. The beard is very short and stiff, and curved inwards towards the middle of the chin in a characteristic manner, its colour being reddish-brown. The lower front teeth are narrow.

We next come to the true Caucasian ture (*Capra caucasica*), which appears to be confined to the Central Caucasus, in the mountains between Elburz

•and Daghestan; and is described as being very similar to Pallas's ture, with a spiral curvature to the horns, of which the tips approach one another. These horns have a nearly square cross-section at their bases, and are said to have more or less distinct bosses or knobs on the front. The reddish-brown beard is like that of Pallas's ture, and the lower front teeth are likewise similar to those of that species. The general colour of the hair is said to be very like that of Severtzow's ture, but the head is more reddish, the belly darker, and the tail has longer hairs. That indefatigable sportsman, Mr. St. George Littledale, has recently shot several specimens of this fine goat, two of which he has presented to the Natural History Museum.

Coming to the Western Caucasus, we meet with a ture which is so different from Pallas's ture as to be readily distinguished at a glance. This is Severtzow's ture (*Capra severtzowi*), of which there are two specimens in the Natural History Museum. This animal is found throughout the whole of the mountain region of the Western Caucasus, and presents considerable local variation in colour. It is a powerful creature, with enormous black horns, directed upwardly after the manner of those of the ibex, and curving regularly in one plane, as shown in Fig. 23. They are widely separated at their tips—

in some instances as much as 3ft.—which usually incline downwards, although occasionally outwards. At the base the section of the horns is nearly triangular, and there are more or less well-marked bosses on the front. Indeed, the whole character of these horns is strongly ibex-like, although they are shorter and thicker. They vary somewhat in their inclination and the degree of development of the



FIG. 23.—HORNS OF SEVERTZOW'S TURE. (After Büchner.)

bosses, those in which the inclination is most outward, and the bosses least developed, coming nearest to Pallas's ture.

The lower front teeth are thick and round. The colour of the hair is brownish-grey, with a yellowish tinge, the head and spine being darker, the belly a lighter brown, and the limbs dark, with a light pos-

terior stripe. The brown beard is long and narrow, and the tail short. In size this animal somewhat exceeds the Caucasian ture.

If we had only Pallas's ture and Severtzow's ture to deal with, there would be no sort of doubt that they indicated two very distinct species. But when we have three species inhabiting such a relatively small area as the Caucasus, very strong evidence is required to show that they are really distinct. Without seeing a very large series of horns of all the forms, it is practically impossible to give a definite opinion on the subject. Still, however, there does seem to be a possibility that these three tures may eventually prove to be local races of one species, exhibiting variations in the curvatures and form of the horns analogous to those which we shall see occur in the Himalayan markhor. In this connection it is significant that the Caucasian ture (*C. caucasica*), which, although apparently nearest to Pallas's ture (*C. cylindricornis*), was identified by Dinnik with Severtzow's ture (*C. severtzowi*), inhabits the central portion of the area, and thus serves to connect the eastern with the western form.

Whatever may be the ultimate verdict of zoologists on this point, there can be no doubt that while Pallas's ture serves to connect the goats with the

bharal, Severtzow's ture shows how the sheep-like goats may have become modified into ibex.

With the Spanish ture, or Spanish ibex as it is



FIG. 24.—HEAD OF SPANISH TURE. (After Chapman.)

often called (*Capra. pyrenaica* or *hispanica*), we come to a very well-marked species, distinguished

from the ture of the Caucasus by the horns forming a slight and very open spiral, and being flat on the inner side and keeled behind, so as to present a pyriform cross-section. When viewed from the front, the horns are somewhat lyrate, and on their outer side they have bosses like those on the front of ibex horns. The black beard is small but thick.

So much does this ture differ from other goats, that Dr. Nathusius has recently proposed to separate it from the genus *Capra*, and to associate it with the Barbary sheep, as a connecting group between sheep and goats. It is, however, clearly allied to the Caucasian ture. The form and curvature of the horns of the Spanish ture, and their posterior keel, suggest a transition from the type of horn found in the ibex to that of the markhor, and thus serve to indicate how easily all the modifications of caprine horns may have been evolved from a single form. The present species of ture is not confined to the Pyrenees, but occurs also in central Spain, and the higher mountain ranges of Andalusia and Portugal, the specimens from these different localities presenting more or less well marked variations in colour and the form of the horns. The specimens sent to the Zoological Society's Gardens were obtained from the province of Malaga, in southern Andalusia; and we have evidence that the species has existed in

this region ever since the Pleistocene epoch, as its fossil remains occur in the caves of Gibraltar, in company with those of an extinct rhinoceros and other mammals. It was the variety from southern Spain to which the name *Capra hispanica* was applied.

According to Mr. Abel Chapman* the Pyrenean variety is the largest, and is characterised by the horns of very old bucks tending to assume the smooth form (without prominent knots) characteristic of the Caucasian ture. Heads obtained from the Sierra Nevada, at elevations of about 11,000ft., are stated by the same writer to carry horns as long as those of Pyrenean examples, but often more flattened, while the animals themselves are considerably smaller. The heaviest and most knotted horns are carried by the ture of the central Spanish Cordillera, but there is a complete transition from these to the Pyrenean form. Mr. Buxton tells us that the Spanish ture differs from the true ibex in inhabiting bush-clad country, to which the inward inclination of the tips of its horns is admirably adapted. His account of shooting this species in "Short Stalks" is probably familiar to most of our readers.

* "Wild Spain."

II.—PASANG OR TRUE GOATS.

The second group of wild goats is typically represented by the so-called Grecian ibex (*Capra ægagrus*), the male of which is known to the Persians as pasang. The pasang is with good reason generally regarded by zoologists as the original parent stock of the whole of the numerous breeds of domesticated goats; and it is accordingly termed by Mr. E. N. Buxton, in a very interesting article published in the *Nineteenth Century* for February, 1892,* the "father of all the goats."

In Homeric times the pasang seems to have been abundant throughout the Grecian Archipelago, but in Europe it is now restricted to Crete, the island of Antimelo in the Cyclades, and perhaps that of Joura, north-east of Eubœa. It is, however, common throughout Asia Minor, especially in the Taurus range, and thence extends through Persia into Baluchistan and Sind, and so on to Afghanistan.

The pasang (literally "rock-footed") is readily characterised by its scimitar-like horns, which are much compressed, with a sharp nodose keel in front, the inner side flattened, the outer convex, and the back rounded. Their outer side is ornamented with

* Reprinted in "Short Stalks."

knobs, placed at considerable intervals, and directed backwards from the front edge. In the male, the horns may attain a length of some $48\frac{1}{2}$ in., measured along the curve; but a specimen is recorded with a length of $52\frac{1}{2}$ in. In height, the animal is about equal to the Indian blackbuck, standing about $33\frac{1}{2}$ in. at the shoulder. An excellent figure of a Cretan specimen is given in the "P.Z.S." for 1886, pl. xxxi. From this it will be seen that the appearance of this animal is decidedly striking, the general colour being yellowish-brown, with dark streaks on the face, back, flanks, the front of the limbs, and the neck; the tail and beard being also dark, but the buttocks, belly, and the back of the limbs whitish. The beard is comparatively small. It is in old males, in which the general colour tends to grey, that the dark stripes become most distinct.

A good account of the pasang of Asia Minor is given by Mr. Danford,* while Messrs. Blanford and St. John† describe its occurrence in Persia; and Mr. Buxton's article already referred to leaves nothing to be desired in regard to its "shikar" in Asia Minor. In Baluchistan this goat has been seen near the coast, at an elevation of not more than

* *Proc. Zool. Soc.* 1875, p. 450.

† "Zoology of Persian Expedition," p. 89.

1000ft., while near Tehran it ascends to heights of upwards of 13,000ft. These animals generally appear to go in small herds, often reaching up to twenty or more in number. According to the late Sir O. St. John, who states that he never managed to bag a specimen, in Persia, they are marvellously shy and wary, this wariness being fully confirmed by Messrs. Danford and Buxton. The latter gentleman writes as follows :

Like all animals that live in good covert, these goats have great confidence in its protection, and we saw them more often near the foot of the cliff, within hearing of the drovers on the highway, than at a higher elevation. The best which I secured I killed within easy shouting distance of the railway. But this confidence is accompanied by exceeding watchfulness, and their natural alertness is indefinitely increased by the constant harrying of the natives. The bands, consisting of from four to ten, almost always, according to our observation, posted a sentinel, and more than one promising stalk was spoilt by this inconvenient precaution, the sentinel posted above having been previously invisible to us. On one occasion one of my companions observed that they had established a very complete system of reliefs. Each member of the band took its turn on a commanding rock for about ten minutes by the watch, standing immovable while the others fed below. At the end of that time he would go down, and another instantly mounted to the coign of vantage and took his place ; but the most remarkable part of it was that the turns seemed to be taken in order of seniority, beginning with the kids, followed by the ewes and young rams—the oldest patriarch, who had by that time finished his meal, being last of all ; but he shirked his duties, for he distinctly took a post-prandial nap. Another trick of theirs which I twice observed old *solitaire* males to be guilty of, was, if

they saw, or thought they saw, anything suspicious, to mount a prominent watchtower, and, after a note or two of alarm and warning—a kind of cough which might spell the letters b-u-r-r-up rapidly repeated—calmly lie down and await events. Woe betide the hunter who, lulled into hope, then attempted a scientific stalk, for his labour would be surely wasted.

Their extreme agility in getting over rocky ground is attested by all who have seen these animals in their native haunts ; but it appears that in the lower grounds of Afghanistan they are not sufficiently swift to escape the dogs with which they are hunted by the Cabulis.

It may be mentioned that the bezoar stone—so highly valued in Persia as an antidote to poison, and, indeed, as a remedy against every kind of disease—is a concretion obtained from the stomach of the pasang.

That the pasang is the ancestral stock of all the numerous varieties of domestic goats—and to see how various these are we have but to contrast the long-haired shawl goat of Tibet with the long-limbed and short-haired goats of the plains of India—there can be no reasonable doubt, although there may be local crossings with other wild species. Many of the domestic goats show the backward sweep of the horns characteristic of the pasang, although in others, especially in northern India, the horns assume a spiral form. The latter feature has

suggested an origin from the markhor; but a careful examination will show that in all the domestic breeds the direction of the twisting is precisely the opposite of that which obtains in the wild species.

Till recently, the Pasang was considered to be the only representative of this group; but in 1888 Dr. A. Reichenow came to the conclusion that the wild goat of the island of Joura, to the north-west of Eubœa, represented a distinct species, for which he proposed the name *Capra dorcas*. More evidence is, however, required to convince us that this goat is really entitled to rank as a distinct species, since, for what we know to the contrary, it may be merely a cross between the pasang and domestic goats which have run wild, or possibly even merely a peculiar race of wild domestic goats. If it should prove to be a good species it will require a new name, since the name *Capra dorcas* was originally given by Linnæus to the dorcas gazelle.

III. IBEX.

Ibex are distinguished from pasang by their more uniform coloration (in which they resemble ture), and by the form of their horns, which, although showing the same backward scimitar-like curvature, have the front half squared, thus presenting a flat

anterior surface, on which are a number of bold transverse ridges of bosses. In transverse section such a horn approaches a triangle, with the rounded apex behind. The tips of the horns are smooth, much compressed, and broad. As all sportsmen know, the horns of the female ibex are usually very small, and without the knots on the front. With the exception of those of the markhor, the horns of the ibex are the handsomest caprine trophies that the sportsman can obtain. There are four well-marked species of ibex, viz., the Alpine, the Siberian, the Arabian, and the Abyssinian, which will be noticed in this order.

The Alpine ibex, steinbok, or bouquetin (*Capra ibex*), Fig. 25, was formerly distributed throughout the Alps of Savoy, Switzerland, and the Tyrol. At the present day it is, however, extinct except in one or two valleys on the Piedmont side of Monte Rosa, where it is protected and preserved for sporting purposes by the Italian Government. This great restriction of their range has probably diminished the size of the existing representatives of the steinbok; and, since it is known that these animals will breed freely with domestic goats, there is some doubt whether the living specimens which were presented to the Zoological Society in 1862 by the then King of Italy were perfectly pure bred. The beard is very

small—so small that the late Mr. Busk* even denied its existence at all; and the horns are relatively thick, and now of only moderate length, with the bosses on the front edge relatively small.



FIG. 25.—ALPINE IBEX OR STEINBOK.

A pair of horns in the Natural History Museum, which appear to belong to the steinbok, are some 40in. in length, and thus the largest examples we have seen.

* "Phil. Trans." for 1877, p. 118.

The Siberian or Himalayan ibex (*Capra sibirica*), the kél of the Kashmiris, and the skín or iskín of the Tibetans, is the best-known representative of the



FIG. 26.—HEAD OF HIMALAYAN IBEX. (From Kinloch.)

group. It differs mainly from the steinbok by the much greater development of the beard of the male, as well as by the greater length and compression of

the horns, and the larger size of the bosses on their front surface. The reduced size of the existing representatives of the steinbok may, however, have something to do with the size of the horns. The male is a handsome-looking animal, standing some 44in. at the withers, and stoutly built. The general colour is a kind of greyish-white, passing into brown, with a darker streak extending from the forehead down the neck and back, and the chest, flanks, and front of legs showing a similar dark tint, the flowing beard being brown. There are, however, considerable variations in colour, some specimens from Baltistan, or Little Tibet, as well as from the Kuenlun range, being so dark as to have acquired the designation of the "black ibex." The horns of the male vary from about 40in. to 52in. in length, although the latter dimensions are but rarely attained. The figure is taken from a Kashmir specimen.

Although some attempts have been made to show that the Himalayan ibex is distinct from the typical *C. sibirica* of the Altai and north-eastern Turkistan, yet no good characteristics have been given by which they can be separated, and there is, accordingly, but little doubt that they constitute a single species. Its most northerly range appears to be the Altai and Sayansk mountains, in the southern

portion of Siberia, to the south-west of Lake Baikal. Thence it is found to the south-west in the Thian Shan and Hindu-Koh ranges, which doubtless form its westerly limit. It is abundant on the Pamir plateau and in Wakhan, and thence extends across the Kuenlun range into Ladak and Kashmir territory. In Kashmir it is found in suitable localities of the mountains to the north and east of the valley, but does not occur in the Pir Punjal range on the south, while its westerly limit appears to be marked by the river Jhelam. Eastward it is said to range as far as Nipal, but is unknown from the easterly Himalayas, although reported from Tibet to the northward of Sikhim.

Ibex, as a rule, keep immediately below the snow, and in summer are generally found above the forest level in those districts where there is any forest at all. During the day they retreat to the most inaccessible crags, coming down to feed on the grassy slopes at morning and evening. Their habits depend, however, greatly on the extent to which their haunts are visited by sportsmen, the ibex in the neighbourhood of the Kashmir valley being far more shy and wary than those in the more remote districts of Ladak and Baltistan. Occasionally a sudden snowstorm will drive them down to a very low elevation even in summer; and I once saw

a small herd thus driven down in June to the high road between Kashmir and Leh, on one of the tributaries of the Indus. In winter the natives state that in the deep and secluded valleys of Wardwan and Tilel, which adjoin Kashmir, the ibex will come quite close down to the villages, and numbers are then killed in the snow. Writing in 1854, Colonel F. Markham speaks of the Himalayan ibex occurring in flocks of 100 or more. Nothing approaching these numbers, are, however, to be seen at the present time in the neighbourhood of Kashmir; and, now that so many of the native shikaris are armed with rifles, the time is not far distant when ibex stalking will practically come to an end in these districts.

Since Colonel Markham, General Kinloch, and others, have written very fully on this subject, it need not be further mentioned here; and the notice of the species may be concluded by the following quotation from the latter, who writes:

I consider ibex shooting to be the very finest sport in the Himalayas, and, in my opinion, pig sticking and elephant shooting are the only sports of India to which it is inferior in interest and excitement. The markhor may be a finer animal than the ibex, but it is more of a forest-loving beast, and does not afford nearly so many chances as the latter. The ibex is to be found among the grandest scenery in the world, and, as it inhabits the more open parts of the hills, it may always be found by those who are acquainted with its haunts. May and June are doubtless the best months for ibex shooting.

A remarkable variety of the ibex, believed to be from the regions N.W. of Kashmir, has been described by Mr. R. A. Sterndale, which, it is suggested, may prove to a distinct species. It has peculiar outwardly curved horns, with but few knots on the front. If it proves to be distinct, the name *Capra dauvergnei* has been proposed for it.

Our next species is the Arabian, or Sinaitic, ibex (*C. siniatica* = *arabica*, or *nubiana*)—the *beden* of the Arabs. This species inhabits the Sinaitic peninsula and parts of Palestine, as well as Upper Egypt. According to Canon Tristram, it is abundant in Arabia Petræa, where it is frequently shot by the Bedouins, but is more rare in Palestine proper, its northern limit being apparently the spurs of the Lebanon, where a few still linger. In Egypt it apparently does not range much, if at all, south of the Tropic of Cancer. The specimen recently exhibited in the Zoological Society's Gardens (a good figure of which is given by Mr. Sclater in the "P.Z.S." for 1886, pl. xxxii.), was probably obtained in the mountains to the north of Suakin. The horns are rather more compressed and more slender than in the Himalayan ibex, with the bosses disposed at irregular intervals. The beard is small but long. In general colour the fur is yellowish-brown, with dark markings on the back, chest, and the front

of the legs, the under parts being whitish. The horns of bucks attain a length of about 36in. in fine specimens. Canon Tristram speaks of the bedouins affording excellent venison, but it may be presumed that he refers to kids or does, as the flesh of other buck ibex is so strong as to be quite uneatable.

The Abyssinian ibex, *C. walie*, which inhabits the highest ranges of Abyssinia, appears to be known in Europe solely by the typical specimens preserved in the museum at Frankfort. Mr. Sclater speaks of it as a very well-marked species, both as regards the shape of its horns, and the curious bony protuberance in the middle of the forehead.

IV. MARKHOR.

This group is represented only by the well-known markhor (*Capra falconeri*=*C. megaceros*) of the Himalaya, which General Kinloch considers "the most magnificent game animal possessing horns that is to be found in the world." This goat is remarkable for the great variation displayed by the spirally twisted horns—a variation so great that it has often been considered that there are at least two species, although the general consensus of opinion among competent zoologists is against this

view. The name markhor, it may be mentioned, means snake-killer in Persian; but whether there is any foundation in the habits of the animal for this title appears doubtful.

The male markhor is a larger animal than the Himalayan ibex, standing about 44in. at the shoulders. In the Kashmir variety, the body is

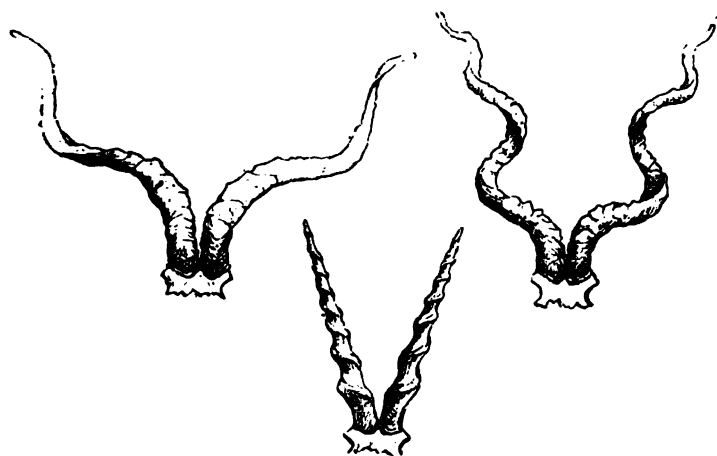


FIG. 27.—HORNS OF THE THREE CHIEF VARIETIES OF THE MARKHOR. The left-hand figure is the Baltistan variety, the right hand the Kashmir variety, and the lower one the Suliman variety. (After McIntyre.)

covered with long shaggy hair, attaining its greatest length on the neck and shoulders, and forming a magnificent beard on the chin and cheeks. The general colour is a light bluish-grey, having a reddish tinge in summer, with the beard darker, and the fore-legs brown. The magnificent horns are

very much compressed and flattened, placed close together on the skull, and having the back ridge much more prominent than the front one. They are twisted into an open spiral, after the fashion of those of the kudu among antelopes, the back ridge curving forwards to form the prominent front ridge in the middle of the first turn of the spiral. This type of horn is shown on the right hand of Fig. 27 and the centre of Fig. 28. It will be observed that in the second turn of the spiral a subsidiary ridge is formed on the front of the horns, corresponding to the front ridge of their base. In this variety the horns usually attain a length of from 40in. to 50in., measured along the ridge; but General Kinloch records one of 63in. As in other goats, those of the female are very small.

This variety occurs in the great mountain range known as the Pir Punjal, forming the barrier between the valley of Kashmir and the outer ridges of the Himalaya. It is also found in the Kaj-Nag range, which constitutes the continuation of the Pir Punjal to the north-west of the river Jhelam. These ranges are covered to a considerable elevation with forest and scrub, and it is where there are alternations of grass-land with the forest at high elevations that markhor are found. The animal is essentially a forest one, and thus differs from the

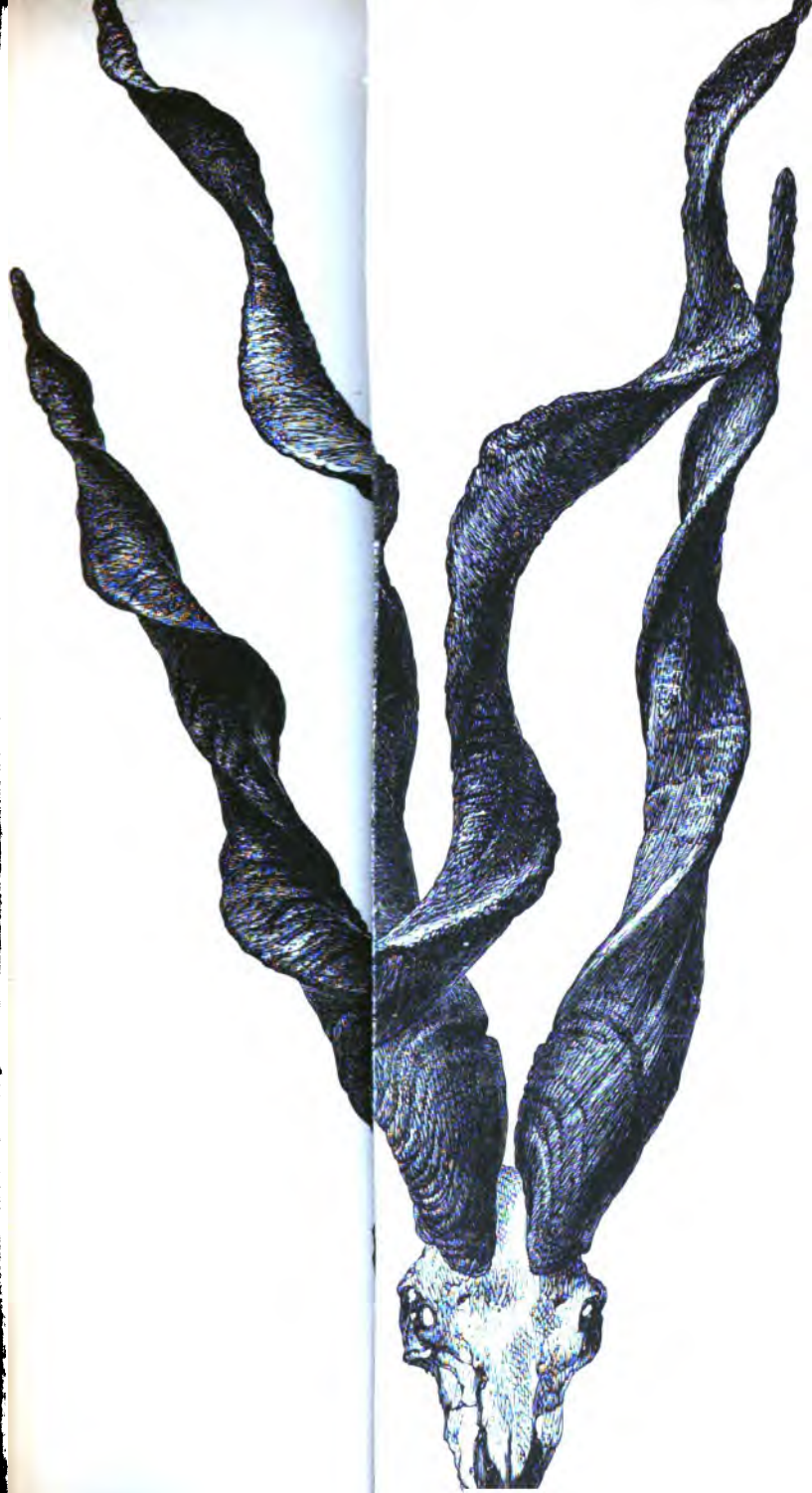
ibex, of which there are none in the Pir Punjal. In these regions the markhor select the most precipitous and difficult ground, and, since they are excessively shy and wary (far more so than the ibex), their pursuit calls for all the powers of the sportsman, and a man who can bag markhor can bag any kind of horned game. In the summer the sexes separate, the does retreating to the crags above the forest, while the bucks conceal themselves still more closely in the latter; and it is at this time that they are most difficult to stalk.

If we now proceed across the valley of Kashmir to the mountains on the north side, we shall find in the neighbourhood of Astor and Gilgit in the north-west, and about Scardu, in Baltistan, to the north, a variety of the markhor having horns like those shown on the left side of Fig. 27. These horns, after a short upward course, diverge very widely, and then are again directed upwards with a slight twist. It is quite easy to see how the horns of this variety could pass into those of the first variety; and it is indeed quite probable that in the districts of Chilas and Upper Hazara, on the north-west of Kashmir, markhor may be found with horns of an intermediate type. Like their kindred of the Pir Punjal, the Baltistan markhor inhabit forest-clad districts—the forests in these regions occurring only

high up on the mountains. It is this variety of markhor which has, I believe, the largest horns; and the finest specimens that have come under my notice were some shot by Mr. Otho Shaw.

We have seen that the Kashmir markhor extends into the Kaj-Nag range to the north-west of the Jhelam valley, and if we proceed still further westward, into the district of Hazara and the neighbourhood of Peshawar, we shall find that the markhor of these districts have a much less open spiral to their horns, which consequently assume a form somewhat between that of a corkscrew and a screw. It was of this variety that specimens from near Peshawar have been exhibited in the Zoological Society's gardens. And it may be remarked, in passing, that a male of those specimens exhibited in a most striking manner the extraordinary agility so characteristic of his kind. These animals were kept in the inclosure on the further side of the canal, now tenanted by the tahr, one part of which is surrounded by a high wall, on the top of which the male, in spite of being loaded with a heavy chain, was found almost every morning. How he managed to make this ascent has remained, I believe, always a mystery.

Returning to the distribution of the markhor, and passing to the Suliman range, forming the eastern frontier of Afghanistan, it is found that the variety



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from that district has almost perfectly straight horns, with a double spiral flange or ridge running up them; the more prominent flange being formed by a continuation of the hinder ridge of the base, and the smaller one by the front ridge. These horns are shown in the lower part of Fig. 27, and on the two sides of Fig. 28, and, if the corkscrew-like horns of the Kashmir markhor are compared with those of the kudu, the screw-like ones of the Suliman variety may be as aptly likened to those of the eland. We are at present unacquainted with the western limits of the range of the Suliman markhor; but it is probably widely spread over Afghanistan, and may enter Khorassan, in Western Persia, although it is certainly absent from the eastern half of that country. It was first described by Captain Hutton in 1842, under the name of *Capra megaceros*, the Kashmir variety having been named *C. falconeri* at a rather earlier date. If, therefore, the Suliman markhor were a distinct species, there would have been no need to propose for it the name of *C. jerdoni*, as was done by a well-known Indian zoologist. The intermediate Peshawar form clearly shows, however, the passage from the Suliman to the Kashmir markhor, and we thus have an interesting example of the passage of one well-marked local race of an animal into a very different one. The bearing of this on

the question as to the number of species of ture in the Caucasus has already been mentioned. The Suliman markhor is altogether a smaller animal, with shorter horns than either of the other varieties, and, according to General Kinloch, also presents certain differences in coloration.

With regard to the eastern limits of the range of the markhor, there is still some uncertainty. To the south-westward of Kashmir, I believe it is unknown beyond Kishtwar, and it seems likewise absent from the Wardwan Valley, the upper part of which is such a fine ibex ground. Since, however, the Ladakis have a name for the animal, it may possibly occur on some of the borders of that district; but it is certainly unknown in the greater part of that country, as well as in the Tibetan districts to the north, where the climate is arid and forests are wanting.

Horn-cores closely resembling those of the markhor are found fossilised in the Punjab, thus indicating that goats of this type have existed in North-western India since the Pliocene period. The absence of such horn-cores from the sandstones of the Siwalik Hills, in the more eastern Himalaya, the fauna of which was first made known to us by Falconer and Cautley, suggests that markhor never extended to these regions, from which, as we have seen, they are now absent.

V. TAHR.

With this, the last group of goats, we come to two species inhabiting India, and distinguished from those previously mentioned by the relatively small size of their horns, which are much compressed, of great depth, and curved backwards; as well as by their moist and naked muzzles, their longer and more slender heads, and the absence of a beard. Both species have been separated generically from the other goats, being by some referred to two genera, but by others placed together under the name of *Hemitragus*. It is the latter plan which is here adopted. The tahr (*Hemitragus jemlaicus*) is found in forest regions at considerable elevations throughout the whole outer Himalaya, from the Pir Punjal in Kashmir to Bhutan. The name tahr (possibly derived from the same root as the Caucasian ture) is used in the Simla district, but in Kashmir is replaced by kras. Tahr appear to be most abundant in the neighbourhood of Kishtwar, and thence up the valley of the Chinab, or Chundra-Bagha, as this river is locally called. They are quite unknown in the mountains to the north of the Kashmir Valley, and are thus essentially inhabitants of the outer Himalayan ranges. Tahr inhabit nearly or quite as bad ground as markhor, and their habit of concealing

themselves in the densest thickets renders their pursuit a task of extreme difficulty, and one calling for great caution. Tahr are now probably well known by appearance to many; since several specimens have been exhibited of late years in the Zoological Society's Gardens, where they have bred. They are somewhat clumsily built animals, clothed with long reddish brown or fawn-coloured hair, which becomes shorter and nearly black on the face. The chest and shoulders carry a flowing mane, but the males of this and the next species are exceptions among goats in having no beard. Other peculiarities are shown by the absence of the glands in the fore-feet, and by the presence of four mammæ in the doe. A male stands from 36in. to 40in. in height at the shoulders; and the horns in fine specimens may reach a length of 15in., while in one case a length of 16½in. has been recorded. These horns are of a full black colour, very much compressed, and narrowing gradually to their inner front angle, which forms a sharp beaded ridge. Besides their backward sweep, the horns of the tahr diverge rapidly from their closely approximated bases.

In the neighbourhood of Kishtwar I have seen tahr in herds of about twenty. General Kinloch observes that "female tahr may be frequently found on open ground, but old males hide a great deal

in the thickest jungle, lying during the heat of the day under the shade of trees or overhanging rocks. Nearly perpendicular hills with dangerous precipices, where the forests consist of oak and ringal cane, are the favourite haunts of the old tahr, who climb with ease over ground where one would hardly imagine that any animal could find a footing."

A fossil tahr (*Hemitragus sivalensis*) occurs in the Pliocene sandstones of the Siwalik Hills in North-eastern India, and thus proves the antiquity of this group of goats.

The last representative of the goats is the wariatu, or so-called Nilgiri ibex (*Hemitragus hylocrius*), of the Western Ghats of Southern India, and more especially the Nilgiri and Anamalli ranges of these mountains. That the wariatu is closely allied to the tahr seems beyond doubt; but it is one of the difficulties in zoological distribution to account for the one being confined to the Himalaya and the other to the mountains of Southern India. It is true that a late glacial period in India would solve the difficulty, but of this we have no decisive evidence.

The wariatu differs from the tahr very markedly in the form of its horns, these being much thicker and less divergent than in the latter, and also marked with fine parallel transverse ridges, while their outer anterior angle is rounded off, so as

to leave a distinct front face, which is totally wanting in the tahr. These horns, although small, are decidedly handsome trophies, and usually attain a length of about 12in., although they not unfrequently reach 15in., while in single instances 16in. and even 17in. have been reported.

Then, again, the presence of only a short stiff mane on the neck of the male wariatu affords another point of distinction from the tahr; while the female differs by the possession of but two mammæ. In height the Nilgiri goat has rather the advantage over the tahr, standing from 41in. to 42in. at the shoulders. In colour the male is dark brown, with a more or less distinctly defined saddle-like patch of a paler reddish tint, and likewise becoming paler on the flanks and under parts. The legs are dark brown in front, and paler behind, with a whitish grizzle pervading their whole extent. The dark head has a fallower grizzling, the eye being surrounded with a fawn-coloured spot.

Wariatu, although occasionally seen on the sloping summits of the northern and western faces of the Mysore plateau, are more generally found some way down the sides of these mountains at elevations of from 4000ft. to 6000ft., where they feed on the grassy slopes at the feet of the numerous precipices. They generally appear to go in herds of from six or

seven to about twenty in number, but much larger parties of females have been observed. Their agility in climbing and getting over difficult ground seems to be about equal to that of their Himalayan congeners, and they appear to display equal vigilance and wariness in guarding against the approach of enemies. In parts of the Nilgiris they are now strictly preserved.

As the final result of this survey of the existing wild goats, it appears that, if we reckon three species of ture in the Caucasus, the number of species will be as follows, viz. :

1. *Capra cylindricornis*, Eastern Caucasus.
 2. *Capra caucasica*, Central Caucasus.
 3. *Capra severtzowi*, Western Caucasus.
 4. *Capra pyrenaica*, Spain.
 5. *Capra ægagrus*, Crete, Asia Minor, Persia, Sind, &c.
 6. *Capra dorcas*, Isle of Joura.
 7. *Capra ibex*, Alps.
 8. *Capra sibirica*, Altai to Himalaya.
 9. *Capra siniatica*, Palestine and Upper Egypt.
 10. *Capra walie*, Abyssinia.
 11. *Capra falconeri*, Himalaya.
 12. *Hemitragus jemlaicus*, Outer Himalaya.
 13. *Hemitragus hylocrius*, Nilgiris, &c.
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CHAPTER IV.

THE ANTELOPES OF ASIA.

IN the next chapter of this volume we give an account of the various species of antelopes inhabiting the continent of Africa. Since, however, it is in Asia that we meet with ruminants connecting the goats with the antelopes, a review of such Asiatic species, which can be included under the somewhat elastic title of antelopes, will come appropriately here. The true home of the antelopes at the present day is not Asia, but Africa, where, as we all know, these animals, both specifically and individually, are more numerous than in any other part of the world. There is some difficulty in drawing a sharp line between the antelopes of Africa and those of Asia, for in the "no man's land" of Syria and Arabia—which is geographically part of Asia, but zoologically more akin to Africa—there occur several species, such as the Bubaline, Addax, and Beatrix antelopes, which are essentially of an African type, and very different from those of Asia proper.

It will be advisable, therefore, on the whole, to omit mention of these species, but to include the gazelles of Arabia, as being related to those of Asia. With the exception of the gazelles, the true Asiatic antelopes are quite different from their Ethiopian cousins; and one particular group forms an almost complete transition between the goats and more typical antelopes.

It may first of all be mentioned that since fossil antelopes, allied to those now inhabiting Africa, are found in the Tertiary deposits of both Europe and Northern India, it seems likely that Europe and Asia formed the original home of the whole antelope tribe. Moreover, since, as we have seen, both goats and sheep have probably been derived from antelope-like ruminants, and since these two groups are chiefly characteristic of Asia—more especially Central Asia—it is probable that we have in the existing goat-like antelopes of Asia the actual descendants of the connecting links between the typical goats on the one hand and the typical antelopes on the other. But it may be asked what kinds of ruminants are included under the term "antelope," seeing that there is such marked affinity between the Asiatic representatives of the group and the goats. To this very natural query almost the only satisfactory reply to be made is that the

term must apply to every hollow-horned ruminant not coming under the denomination of oxen (including bison, buffalo, yak, &c.), sheep, goat, or prongbuck. It will thus include the whole of the hollow-horned ruminants of Africa (such as elands, gnus, hartebeests, gemsboks, springboks, &c.), with the exception of the oxen, the Abyssinian ibex, and the Barbary wild sheep, and such of those of Asia as do not belong to the oxen, goats, or sheep.

The Asiatic antelopes naturally arrange themselves under eight groups—namely, (1) goat-like antelopes; (2) takin; (3) nilgai; (4) four-horned antelope; (5) black-buck; (6) chiru; (7) saiga; and (8) gazelles, of which the first and last include several species, while each of the others has but a single representative. It may be added that, while the first and second groups are closely related to one another, and have no very near kin elsewhere, the third and fourth are respectively more or less nearly allied to two groups of African antelopes, and the other four are intimately related. By the time that the reader has come to the end of this survey of the Asiatic antelopes, he will scarcely fail to remark that in Southern Asia, India marks the extreme easterly limits of the whole group, with the exception of a few species of the goat-like antelopes, which extend into the Malayan Islands, and even as

far east as Japan. The total absence of more typical antelopes from all these regions is, however, very remarkable, and suggests that they have been long cut off from free communication with India.

With these preliminary remarks, which are essential to a proper comprehension of our subject, we may proceed to a consideration of the various groups, commencing with

I. THE GOAT-LIKE ANTELOPES.

Every Himalayan sportsman is familiar—at least by name, for it is not a common beast—with the large, clumsily-built creature known as the serow (more correctly sarao), and also with its smaller and rather more graceful-looking cousin, the goral, both of which may be regarded as typical representatives of the goat-like antelopes of Asia. Neither of these two animals have much to boast of in the way of “trophies,” but since the former, in addition to its comparative scarceness, is also exceedingly shy, and inhabits very difficult country, its “shikar” calls into play all the resources of the sportsman. The serow (*Nemorhædus bubalinus*) stands about 37in. in height at the shoulders, and generally has a total length, from the muzzle to the tip of the short tail, of something over 5ft., while it will turn the scale at

over 200lb. The essential features of the serow, from a naturalist's point of view, are to be found in the short and hairy tail, the presence of "tear-pits" on the face, of small glands between the thick, clumsy hoofs of all four feet, and the naked muzzle. Then, again, the horns (Fig. 29), which are present

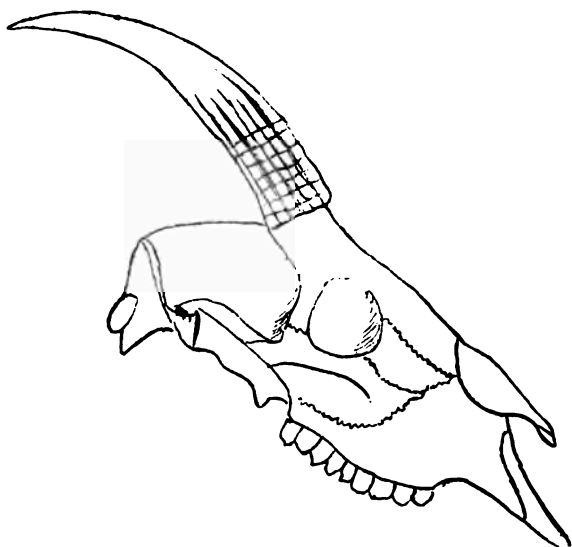


FIG. 29.—SIDE VIEW OF SKULL OF SEROW, $\frac{1}{4}$ NATURAL SIZE. (AFTER GRAY.)

in both sexes, and scarcely smaller in the does than in the bucks, are exceedingly characteristic, and quite unlike those of any other group of antelopes. In length they are considerably less than the skull, while in form they are cylindrical and tapering, and

marked at the base with fine transverse wrinkles, crossed by a number of longitudinal striations. They are black in colour, and at first slope backwards, nearly in the line of the face, after which they are slightly recurved. We have already alluded to the clumsy build of the creature, which is so marked as to have suggested comparison with a donkey. In regard to its hair and colour, we cannot do better than quote the description of General Macintyre, who observes that "the neck is thick, short, and black, and surmounted with a bristling mane of coarse black hair extending back over the withers, which, with its almost black head and large, mule-like ears, grey muzzle, short black horns, and fiery eyes, give this beast a fierce look, which its character does not belie. Its general colour is a very dark kind of roan-grey intermixed with black, black dorsal stripe and tail, flanks and forequarters reddish-brown, creamy-white from above the knees and hocks downwards." The last characteristic is of especial importance, as serving to distinguish this species from the next; and we may add that the black stripe down the back cannot be distinctly observed in all specimens. The hair of the body is coarse, and rather thin, and lacks the fine under-fur, or "pashm," found in so many Himalayan animals.

In its clumsy build, short horns, and thick, blunt hoofs, the serow has so much the general appearance of those two kinds of Indian wild goats known as the tahr and the wariatu, which, as we have seen in the last chapter, collectively constitute the genus *Hemitragus*, that it must be evident to all that the difference between them is but comparatively slight. It is true, indeed, that the horns of the serow lack the angulation which is characteristic of those of nearly all goats; but this angulation is but comparatively slight in those of the Nilgiri wild goat, so that the difference is, after all, but little more than one of degree. It might, indeed, be objected that the presence of a "tear-pit," or gland, on the face of the serow, affords a marked distinction from the goats; but we shall shortly see that this gland is absent in the goral, while its presence in some species of sheep, and absence in others, tells us that this organ is of very little importance in classifying any of the hollow-horned ruminants. We may take it, then, as certain that the serow and the tahr occupy a kind of halfway position between the typical antelopes and the typical goats, the one leaning more to the former and the other to the latter group. The close connection between these two animals seems, indeed, to be perfectly apparent to the natives of the Himalaya; for, whereas in

Nipal the serow is known as the tahr, the animal thus designated in the North-West is there termed the jharal. This confusion of names, we may remark in passing, renders it sometimes a matter of some uncertainty which animal is referred to in sporting accounts of Himalayan game.

Hitherto we have said nothing as to the dimensions reached by the horns of the serow, but as this is a matter of especial interest to sportsmen, we proceed to supply the omission. It appears that a length of from 9in. to 10in., with a basal circumference of some 5in. or 6in., is a fair average for the horns of well-grown males. The "record" dimensions are, however, a length of $13\frac{1}{2}$ in., with a girth at the base of $6\frac{1}{2}$ in.; the largest recorded female horns not exceeding $8\frac{1}{2}$ in.

The geographical distribution of the serow is extensive, the animal being found in the outer ranges of the Himalaya from Kashmir in the north-west to the Mishmi Hills in the south-east, while it has also been obtained from Yunnan, on the western frontier of China. It is said to range from elevations of about 6000ft. to 12,000ft. The serow is not very uncommon in the hills north of Dehra Dun, and on the flanks of the Pir Panjal range in Kashmir; but I doubt whether it occurs in the mountains lying to the north of the Valley of Kashmir. In spite of

having traversed a large portion of the outer ranges of the north-west Himalaya, I have never had the good fortune to see a serow in the flesh, and cannot, therefore, speak of its habits from personal experience; Gen. Kinloch's excellent account is, however, probably familiar to most Himalayan sportsmen. The serow is there referred to as a shy, solitary animal, inhabiting rocky ground in or near forest, and as being an adept in getting over difficult country, more especially when going down hill. Writing of the serow in the Dehra Dun district, Gen. Macintyre observes that "its favourite haunts are the wildest of craggy, precipitous, wooded gorges, where dense ringal (a kind of long, thin, reed-like bamboo) jungle abounds, in the deep, gloomy recesses of which it usually lies up during the day, seldom venturing abroad except in the very early morning and late in the evening to feed, and then usually only a short distance from its sequestered retreat. For it is of very shy habit, although its disposition is so bold that it is always ready to show fight when wounded, or even in defence of its wounded mate, with which, as well as with their offspring, sometimes it is found in company, though generally a solitary animal."

The cambing-utan (*Nemorhædus sumatrensis*)—one of those unfortunate animals labouring under

a plethora of scientific names—differs from the Himalayan serow by its more ruddy colour, and especially by the legs being of the same rufous tint as the body. Unfortunately, however, for those naturalists who like to have as many species of animals as possible, and these sharply distinguished from one another, Gen. Kinloch once shot a remarkable serow near Darjiling, which was intermediate in colour between the ordinary species and the typical cambing-utan. This leads Mr. Blanford to doubt whether the latter is really entitled to be regarded as a distinct species. It has, indeed, been stated that the cambing-utan is smaller than the Himalayan serow, but the difference in size is, at most, but slight. Apart from the question whether it is a distinct species, the cambing-utan is found in hilly districts, generally at lower elevations than the ordinary species, from the Eastern Himalaya to Moupin, in Eastern Tibet, and thence to Yunnan, as well as in Assam, Burma, the Malay Peninsula, Siam, and the Island of Sumatra. Its habits are the same as those of the serow. The name cambing-utan, we may mention, is a Malay term signifying goat-of-the-woods; the latter half of the name also occurring in orang-utan, the-man-of-the-woods.

In Japan this group of animals is represented by a much smaller species, the Japanese goat-antelope

(*Nemorhædus crispus*), which does not much exceed the goral in size. We know very little of this species in a state of nature, but a specimen was exhibited in the Gardens of the Zoological Society in 1879. It is characterised by its crisp brownish hair, which becomes white on the flanks and cheeks, the legs being blackish-brown.

The island of Formosa enjoys the distinction of having a species of this group all to itself, and as this said species was originally discovered by Mr. Swinhoe, at one time H.B.M. Consul in China, it has been appropriately named Swinhoe's goat-antelope (*Nemorhædus swinhoei*). It agrees in size and the nature of the fur with the Japanese species, but differs by its generally darker colour and the yellower tint of the flanks and sides of the face. It inhabits the chain of hills running down the centre of the island.

With the Himalayan goral (Fig. 30) we come to the first representative of a second group of goat-antelopes, distinguished from the serows by the absence of a tear-bag on the face, and also by the marked angle formed in the profile of the skull at the point of origin of the horns. In consequence of these and other small points of difference these antelopes are now referred by our latest authority to a distinct genus, the proper scientific title of the

goral being *Cemas goral*. In height the goral stands some 27in. at the shoulder; while the horns of males do not usually exceed 8in. in length, and are often not more than 6in., although a maximum



FIG. 30.—THE HIMALAYAN GORAL.

length of $9\frac{3}{4}$ in. is on record. The horns are black in colour, and resemble those of the serow in their general characteristics. The general colour of the

fur of the goral is brown, with a more or less decided grey or ruddy tinge, and not much paler below than on the back. The throat is, however, white; and there is a dark line running down the back to the black tail, while the front surfaces of the legs are also marked by dark streaks.

Goral inhabit the ridges on the outer side of the great snowy chain throughout the Himalaya from Kashmir to Bhutan, at elevations of from about 3000ft. to 8000ft. above the sea level. They are generally found in small family parties of from three or four to eight in number, and frequent rough ground with grassy hills, usually in the neighbourhood of forest. They may, however, occur in pairs. Goral are less shy than serow, and in cloudy weather will feed throughout the day.

If serow horns do not offer much in the way of trophies to tempt the sportsman, still more is this the case with those of the goral. In spite, however, of this drawback, goral shooting has attractions on account of being less arduous than many other kinds of Himalayan sport. General Macintyre observes that "goral stalking in the precipitous and broken ground in the middle ranges of the Himalaya is, perhaps, the pleasantest, though not the grandest, kind of mountain sport. The amount of stiff climbing it entails is quite enough

to give it zest without making it excessively laborious."

In Eastern Tibet the place of the goral is taken by two species—respectively known as the grey goat-antelope (*C. grisea*) and the ashy goat-antelope (*C. cinerea*), which differ in colour both from the goral and from one another, and are said to approximate in some respects to the serow. It is scarcely necessary to mention that no specimens of these antelopes have hitherto been bagged by European sportsmen.

The sole remaining member of this group is the long-tailed goat-antelope (*C. caudata*), from the mountains of Northern China and Amurland, which differs from all the other species, in that the tail, instead of being only some four inches in length, reaches to the hocks. We have no record that this species has ever been hunted by Europeans.

II. THE TAKIN.

In the year 1850, Mr. Brian Hodgson, then British Resident at Khatmandu, the capital of Nipal, first made definitely known to science the remarkable animal of which the upper part of the skull is represented in the accompanying figure. This creature is the takin of the Mishmi tribes

inhabiting the valleys to the north of the Assam frontier, by whom its horns, and more rarely its skin, are occasionally brought into British territory. Strange to say, that, although some of the hills on which it dwells are actually within sight of British Assam, no English sportsman has ever shot a takin, nor, indeed, we believe, has a living specimen ever been seen by an Englishman. In the neighbourhood of Moupin, in Eastern Tibet, where the takin is also found, the celebrated French missionary Père David, who has done so much to advance our knowledge of the natural history of these regions, succeeded in obtaining several specimens of the skin and head, and may possibly have seen the creature in the flesh. The native explorers, who have traced the course of the Sanpu in Tibet for the survey of India, must doubtless have come across the takin in its native haunts; and we may hope that the day is not far distant when some enterprising British sportsmen will succeed in penetrating these regions and in bagging the first takin.

According to Mr. Hodgson's description, supplemented by the specimens in the British Museum and other collections, the takin agrees with the serow in its clumsy and heavy build, but is much larger, standing $3\frac{1}{2}$ ft. at the withers. It has likewise a similar short and goat-like tail, measuring about 3 in.

in length. Its nose is very convex. In colour the takin varies from a yellowish-dun to a reddish-brown mingled with black, but in all cases the head is entirely black. The hair is rather long and shaggy. The most remarkable feature of the animal is, how-

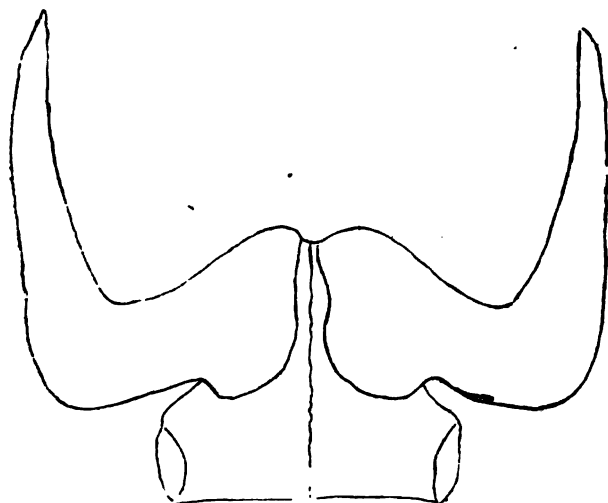


FIG. 31.—OUTLINE OF HORNS OF TAKIN. (After Hume.)

ever, to be found in its horns, which are very large and massive, slightly wrinkled at the base, but smooth at the tips, and in the adult male (Fig. 31) are placed close together at their bases, and at first bend down over the eyes, and then suddenly ascend upwards, the whole curvature recalling that of the horns of the African gnu. There has been some doubt as to the form of the horns of the female

takin; but, according to Mr. A. O. Hume (who has recently presented a fine series of heads to the British Museum), they are very thick, and curve at first outwards and then upwards, in a somewhat ox-like fashion, without any downward flexure. The horns of the male here figured measure, according to Mr. Hume, 22in. in length on the right and $22\frac{1}{2}$ in. on the left side, with a basal girth of 13in. and $13\frac{1}{2}$ in. The largest pair known to the same writer has, however, a length of $24\frac{1}{4}$ in. measured along the curve, a basal girth of $12\frac{3}{4}$ in., and a span of $13\frac{3}{4}$ in. from tip to tip. Very little is known of the habits of takin. They are, however, described as living either in herds or singly in the highlands of Eastern Tibet and the Mishmi Hills, and from their clumsy feet, with large lateral hoofs, it may be inferred that they frequent rough ground. Like the serow, the takin is evidently related both to the goats and the more typical antelopes; and it may, indeed, be not inaptly compared to a large serow with an enormous development and different form of horns.

III. THE NILGAI.

The well-known nilgai, or more correctly nilgau* (*Boselaphus tragocamelus*), of Peninsular India, is the only representative in Asia of that group of antelopes which includes the harnessed antelopes, kudus, and elands of Africa. All these antelopes are of large or medium size, and characterised by the absence of rings on their horns, which are ridged in front, at least at the base. The nilgai is readily distinguished from all its African cousins by the small size of its black horns, which are present only in the bulls, these horns being placed behind the eyes and in section triangular at the base, and nearly straight. Another distinctive feature of the animal is the great length of the fore as compared with the hind limbs. The nilgai derives its name from the dark, slaty grey hue of the bulls, which varies from bluish to brownish in different individuals. Its appearance is so well known to all Indian sportsmen that it is unnecessary to say much about it here, although we may call attention to the mane on the neck of both sexes, the tuft of hair on the throat of the bulls, and the white rings round the

* From *nil* or *lil*, blue, and *gau*, cow. The latter word is again met with under another form in *gaur*.

fetlocks in both bulls and cows. The tail is long and tufted. Cows and calves are readily recognised by their brown colour, as well as by the absence of horns. A bull nilgai usually stands from about 4ft. 4in. to 4ft. 6in. at the shoulder, and the

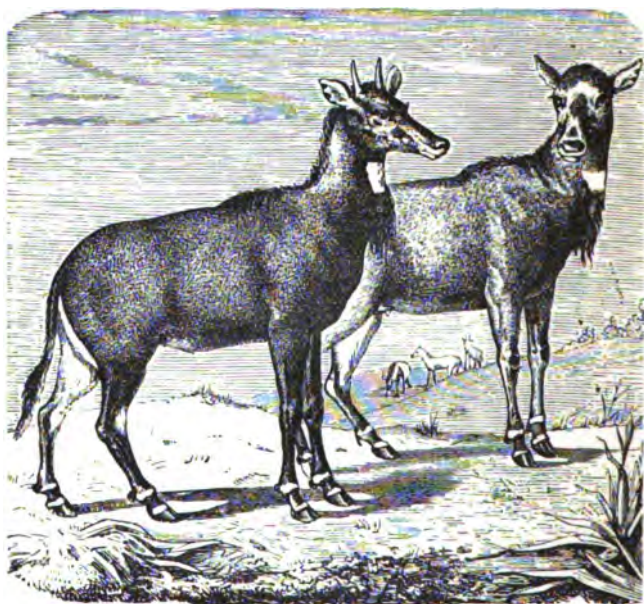


FIG. 32.—THE NILGAI.

horns average from 8in. to 9in. in length, although one pair has been recorded with a length of $11\frac{3}{4}$ in. Sir Samuel Baker gives the weight of a bull nilgai as upwards of 600lb.

Nilgai are found in Peninsular India from the foot of the Himalaya to the south of Mysore, but are unknown in Eastern Bengal, Assam, the Malabar coast, and Ceylon; while to the north-west their range does not extend to the Indus. Some of the districts where these animals are most common are the Central and North-west Provinces, the Guzerat District, and the Eastern side of the Punjab. They are generally found either in open plains, where there is good grazing, or among low jungle and scrub, but not in thick forests, as a general rule. Bulls are usually found solitary, but Mr. Blanford mentions having seen as many as twelve together; and one or two bulls may be observed occasionally among the small droves in which the cows and calves congregate. A peculiarity of the nilgai is that it cares but little for the midday sun of India, and may be found feeding almost at any hour.

From the poor trophies which its insignificant horns present, the nilgai is but little sought after by sportsmen, although it is sometimes ridden down and speared or shot. A bull to be ridden down must be pressed by a sharp burst at starting, when it can be easily "blown," as, if allowed to get its "second wind," it will go on almost for ever, and tire out any horse. According to Gen. Kinloch, the cow cannot be ridden down by a single horseman. Sir Samuel

Baker speaks of nilgai as very shy animals, and more difficult to approach than the sambar deer; but in districts inhabited by Hindus they frequently become very tame, being regarded as akin to the sacred cow, and therefore protected and favoured. Mr. R. A. Sterndale tells us that he once succeeded in taming a bull nilgai sufficiently to carry small loads, and even a rider. The riding does not appear, however, to have been particularly pleasant, as the make of the creature prevented its carrying a saddle. Moreover, as it was inclined to be a bit "nasty" with its horns, which, though small, are formidable weapons, we do not think that nilgai-riding is likely to come into fashion.

Remains of extinct nilgai are found in the gravels of the Narbada Valley, and also in the sandstones of the Siwalik Hills on the flanks of the Himalaya. And since in the latter district these remains are accompanied by those of antelopes allied to the kudu and eland, while species kindred to the two latter are also found in the Tertiary deposits of parts of Europe, we may pretty safely conclude that South Europe and Asia formed the original home of this group of antelopes. And naturalists have yet to explain satisfactorily why all the forms with long spiral horns like the kudu and eland migrated into Africa and disappeared from the other continents,

while the nilgai lived on in India, and has been unknown elsewhere.

IV.—THE FOUR-HORNED ANTELOPE.

In spite of its small size and insignificant horns, a certain amount of interest will always attach to the four-horned antelope (*Tetraceros quadricornis*), as being the only living animal (except certain domesticated races of sheep and goats) which has two pairs of horns. We say living animal advisedly, because in that mausoleum of extinct animals—the Siwalik Hills—there is found a huge ruminant, far larger than the elk, which was furnished with one pair of spreading antlers at the back of the head, and also with a small pair of cylindrical horns on the forehead.

With that unfortunate propensity to transpose names to which we have already had occasion to allude, the four-horned antelope is not unfrequently designated by sportsmen as the chinkara, a name which belongs properly to the Indian gazelle. Truth compels us, however, to state that this error was originally due to the late Gen. Hardwicke, who was at least as much of a naturalist as a sportsman. The proper native designation of the animal under consideration is chousingha, meaning four-horned. It is, however, often termed jangli bakri—jungle

goat—and it is from this that the name jungle sheep, by which the animal is sometimes known in Madras, is derived.

The chousingha, which is the smallest of all the Indian hollow-horned ruminants, is nearly related to the duikerboks of Africa, from which it is distinguished not only by its four horns, but by the structure of its teeth and several other features. In

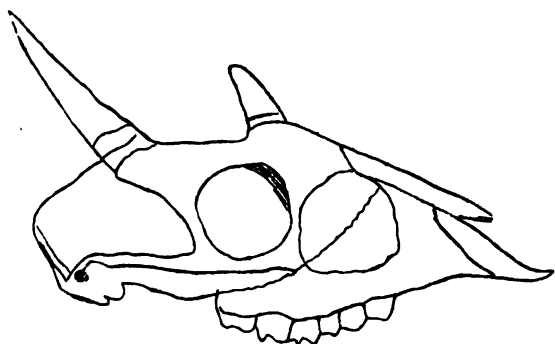


FIG. 33.—SIDE-VIEW OF SKULL OF FOUR-HORNED ANTELOPE. (After Gray.)

colour the chousingha is brownish-bay, lighter underneath, and with dark "points." It stands from 24in. to 26in. in height at the shoulder, and is rather higher at the rump, which gives it a somewhat ungainly appearance. The hinder pair of horns (Fig. 33) are much the larger of the two; and both are black, cylindrical, and slightly wrinkled at the base, and inclined somewhat backwards. From

variation in the size of the horns, and the absence in some instances of the first pair, it has been thought that there was more than one species of chousingha, but it is now known that this is not the case. In Madras it appears that the front pair of horns are not unfrequently absent, but in some cases it would seem that such absence is due merely to immaturity. The length of the hinder horns is usually from 3in. to 4in., but a length of $4\frac{1}{2}$ in. has been recorded.

Four-horned antelope are found along the whole length of the flanks of the Himalaya from the Punjab to Nipal, and also over a large part of Peninsular India, where the ground is hilly and covered with patches of low jungle or scrub. They are, however, unknown in the plain of the Ganges, on the Malabar coast, and in Ceylon. These antelope are generally found solitary, or in pairs; and, although not uncommon, are very shy and difficult to find. Mr. Sterndale describes them as awkward in appearance when on the move, running with the neck stretched out in a peculiar manner, and making a series of short leaps. Chousingha are never found far from water, and, according to Mr. Blanford, they drink daily—thereby differing greatly from the Indian gazelle. Opinions differ as to the quality of the meat, although all agree that it is inferior to that of the black-buck or gazelle.

V. THE BLACK-BUCK.

The black-buck, or Indian antelope (*Antilope cervicapra*), is such a well-known animal, and one about which so much has been written, that it might seem almost superfluous to add more; but for these very reasons it must claim an important place in any account of the antelopes of Asia. Like the three preceding species, the black-buck is the sole representative of the genus to which it belongs. And here it is advisable to say a word regarding the use of the Latin term *Antilope*, since it is not uncommon to find in sporting works a number of species of antelopes described as *Antilope* this and *Antilope* the other. This is nowadays totally incorrect, naturalists restricting this term to the single species now under consideration. It is true, indeed, that Linnæus described all the species of antelope with which he was acquainted under the general title of *Antilope*, but the advance of science has shown that such a use of the term is quite inadmissible. With this explanation, we may proceed to notice some of the leading characteristics of the black-buck. In the first place, the male black-buck differs from all the species hitherto considered, and thereby agrees with those remaining for discussion,

in that its handsome horns are marked with bold rings, which in this particular species completely encircle the horns, and extend from base to tip. The horns themselves are placed close together on the skull, and are cylindrical, with an elegant spiral twist, usually comprising from three to four complete turns, but it may rarely have as many as five turns. As they rise from the head, the horns diverge from one another at an angle which is so variable that, in specimens of equal length, the interval between the tips may vary from 7in. to 20in. The does, as a rule, are hornless; but occasionally specimens are found with small horns, curving backwards from the head. The face is characterised by the very large size of the tear-bag, which in the rutting-season is constantly being opened and closed. The tail is short and compressed, and the muzzle completely covered with hair. The hoofs, like those of the remaining antelopes of India, are narrow and pointed.

Old males are, with the exception of the harnessed antelopes of Africa, perhaps the most handsomely coloured of all antelopes, the contrast of the full blackish-brown, or black, of the greater part of the head, neck, body, and outer sides of the limbs, with the white of the under-parts and the ring round the eye, being most striking. According to Sir Samuel

Baker, the bucks do not begin to assume their blackish colour till their third year, and the same writer believes that they do not acquire their full colour until their sixth year. The young bucks, and the does at all ages, are of a rich yellowish-brown above and on the outer sides of the limbs, with the under parts white. This change of colour in the old bucks is precisely similar to that which takes place in the bull banting, and it likewise indicates that the black-buck is, in respect of coloration, what naturalists term a very specialised animal, the sandy colour of the does and young bucks being the normal tint of most antelopes. It is, of course, obvious that the blackness of the old bucks renders them conspicuous objects, but this disadvantage is probably counter-acted by the extreme watchfulness of the herds in which they congregate. Probably, also, the handsome dress of the old bucks is adopted in order to attract the attention of the does.

A male black-buck stands about 32in. in height at the shoulder, and, according to Sir Samuel Baker, will weigh about 85lb. live weight. Mr. Blanford gives from 16in. to 20in. as the average length of horns, measured in front from base to tip in a straight line, over the greater part of Peninsular India, and states that they rarely exceed 22in. in length. In the plains of Rajputana and Hur-

riana longer horns are, however, met with, a maximum length of $28\frac{3}{4}$ in. having been recorded from these districts.

The black-buck is an exclusively Indian animal, ranging from the foot of the Himalaya as far south as Cape Comorin, and from the Punjab in the west to Lower Assam in the east. They are always found in open ground, which may be either grassy or cultivated, and go in herds, sometimes reaching hundreds or even thousands in number, as the writer has witnessed in the neighbourhood of Muttra. More generally, smaller droves of from ten to thirty or forty are met with, each of such parties usually including one fully coloured buck. Black-buck will feed at all hours of the day, but Mr. Blanford brings forward decisive evidence to show that in one locality at least they never drink. This was proved by the presence of herds on a spit of sand some thirty miles in length between the salt Chilka Lake in Orissa and the sea, where the only fresh water was in a well. From this circumstance the writer quoted is induced to suggest that the visits of black-buck to the neighbourhood of water are rather for the purpose of grazing on the luxuriant pasture to be found in such spots than for drinking. Subsequent observers have, however, stated that they have distinctly seen these animals drink.

Accounts of black-buck stalking are so numerous that it would be quite superfluous to refer further to them on this occasion. With regard to their speed, this is estimated by Sir Samuel Baker as upwards of sixty miles an hour—the estimate being based on the statement that the best English greyhound cannot overtake them. Later on, however, the same writer observes that he should imagine “a first-class greyhound would catch a black-buck if it could be slipped within 100 yards upon a level, uncultivated plain, where the surface was absolutely smooth.” That such captures have been effected was long ago clearly stated by the late Dr. Jerdon, who writes that “very rarely good greyhounds have pulled down this antelope, unwounded, on ordinary ground; but there are at least three localities where this coursing used to be practised successfully—one at Pooree, on the east coast, south of Cuttack, where the antelopes are found in the morning on an extensive plain of heavy sand, and, if the dogs are slipped favourably, they are sometimes pulled down before they get on to hard ground. Another is in the desert near Sirsa, where the ground is entirely sandy. The third locality is at Point Calymere, also on the east coast, very far south, not far from Trichinopoly, where there is a tract of fine pasture land, always green and elastic, and on which first-rate English

dogs have repeatedly pulled down black-buck. I rather think that the antelopes here are in somewhat soft condition, the grass being always green, and that from this cause they are more easily caught than elsewhere. During the rains, indeed, if antelopes are found in the fields where the soil is very soft and heavy, they fall an easy prey to good dogs."

Sir Samuel Baker's account in "Wild Beasts and Their Ways," of the coursing of wounded antelopes by his two splendid native dogs Cabre and Mora, is probably familiar to many of our readers.

VI. THE CHIRU.

It is "a far cry" across the great central snowy range of the Himalaya, from the burning plains of India to the haunts of the chiru, or Tibetan antelope (*Pantholops hodgsoni*), in the bleak highlands of northern Ladak and Tibet. Among all the antelopes of Asia the black-buck alone can be compared to the chiru in respect of the length and beauty of its horns; and, *cæteris paribus*, it might be doubtful to which should be assigned the highest place as sporting trophies. To our mind, indeed, the graceful simplicity of the horns of the Tibetan antelope (Fig. 34) renders them even more beautiful

than those of the black-buck ; but, apart from this question, the toilsome and weary marches which the sportsman is compelled to make through a trying country in order to reach the land of the chiru, lends an adventitious value to the trophies there acquired, and thus makes them of far more importance in his eyes than any of those of equal size obtained on the plains of India.

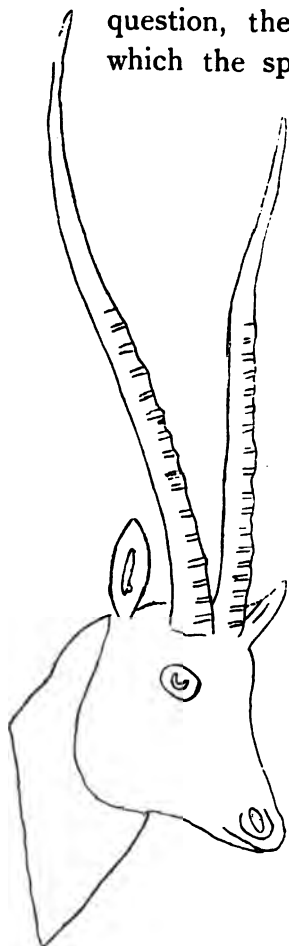


FIG. 34.—HEAD OF MALE
CHIRU. (After Blanford.)

The chiru, of which the buck is also known to the Tibetans by the name of tsus, agrees with the black-buck in that the does are unprovided with horns ; but differs so markedly in structure that it constitutes a genus to itself. Among its important characteristics, we may mention the complete absence of the tear-bag on the face, and the extraordinary swollen and puffy appearance of the muzzle and nostrils of the male. (In our figure,

copied from an otherwise excellent plate of the entire animal, the artist has made the muzzle much too fine and pointed.) Moreover, the nostrils have peculiar additional internal chambers, and the nose cavity in the dry skull is of very large size; both these features being, perhaps, designed to assist respiration in the rarefied atmosphere of the regions where these antelopes dwell. The long black horns of the male are erect, slightly curved, and sublyrate in form; they are further characterised by being much compressed from side to side, with the rings confined to their anterior half, and extending about two-thirds of their length. They are usually about 12in. apart at their tips. In order to withstand the intense cold of a Tibetan winter, the chiru is clothed with a thick and close woolly pile; the general colour of which is a very pale fawn, or yellowish-grey; while in the males the whole of the face and a stripe down the front of each leg are dark brown or black. If, indeed, it were not for its puffy nose, which somewhat detracts from its appearance, the male chiru would be a very handsome animal; and as this disfigurement is not visible when at a short distance, the first sight of a chiru cannot fail to arouse all the enthusiasm of the sportsman. In height the chiru stands usually about 32in. at the withers, but General Macintyre says that they may reach 34in. Horns

are usually from 24in. to 26in. in length, although they have been recorded of 27½in.

Chiru are probably to be found throughout the Tibetan plateau, at elevations of from 12,000ft. to 18,000ft., since they have been met with whenever Europeans have penetrated that country from the Indian side. The only part of the region which they inhabit accessible freely to the British sportsman is Ladak, where the favourite hunting-grounds are on the banks of the Changchenmo river, to reach which we have to cross two passes of 18,000ft. in height. Their numbers in Kashmir territory are, however, now comparatively small to what they appear to be in the closed district lying between Ladak and Lhasa, where, we have been informed by native travellers, they may be met with in large herds. That the chiru—possibly individuals which have lost one horn—has given origin to the legend of the existence of a unicorn in Tibet, we have but little doubt, although whether all unicorns have originated from the same tradition we should not like to say. The name *Pantholops* was applied to the chiru by Hodgson as being the old term for the unicorn. The chiru was first made known to European science in 1826, and named after Mr. Brian Hodgson, but who can lay claim to having shot the first example killed by a European we are

unaware. Like many Indian mammals, the Tibetan antelope rejoices in several scientific designations, and in some works the reader will find it mentioned under the name of *Kemas hodgsoni*, a title of which the former half properly belongs to the goral, under the amended form of *Cemas (vide supra)*. In many respects the chiru is allied to the gazelles, but it is also nearly related to the saiga antelope, which comes next on our list. For a considerable period there was some doubt whether or no the female chiru was hornless, the doubt having apparently arisen from young males having been mistaken for females; but it is now definitely known that only the bucks are horned.

Good accounts of chiru stalking in the desolate Changchenmo valley will be found in General Kinloch's "Large Game of Tibet," and in General Macintyre's "Hindu-Koh," the latter writer giving a graphic account of the complete collapse which is sure to overtake the sportsman who incautiously attempts to run after a wounded animal in the rarefied atmosphere of these regions. General Kinloch tells us that in the summer chiru come to feed in the mornings and evenings on the flat stretches of land bordering the Changchenmo river, where pasture is always to be found, and speaks of seeing herds of sixty or seventy bucks, although a

doe was met with only on one occasion. When I visited the Changchenmo valley in August, 1880, these antelope were, however, much less numerous, and I never saw more than six or seven at a time. My camp was established for several days on the left bank of the river, nearly opposite the halting place of Kyam, at an elevation of between 14,000ft. and 15,000ft., and every morning I used to be awakened at daybreak by my shikari, announcing that haran (Hindustani for antelope) were feeding on the maidan (plain). Unfortunately, I had with me on that occasion only a Westley-Richards single Martini-Henri Express sighted point-blank up to 200 yards. Now, on the maidan, where the antelope fed, there was scarcely cover for a mouse, and I never could succeed in getting nearer than some 300 yards of them. At this distance I used to blaze at them nearly every morning with the Martini-Henri without any more satisfactory result than wasting a cartridge. On one occasion, on returning to camp in the evening, after a day's geological work, I saw some antelope grazing in the open, and fired at them, with the usual result. As ill-luck would have it, the brass cartridge-case must have cracked in the chamber of the rifle, and, on attempting to extract it, the extractor merely brought away the head, leaving the tube in the

chamber. As it would have taken some time to extract the tube, and I wanted to go some way up the valley, I handed back the rifle to the shikari, and commenced my walk—not in the sweetest of tempers at my miss and the mishap to my rifle. Scarcely had we walked 500 yards up the valley than, from one of the small transverse ravines leading down from the elevated maidan to the river, there sprang out a magnificent chiru buck, which stood on the edge of the bank gazing at us broadside on at a distance of some 30 yards, apparently as much astonished as we were ourselves. Needless to say, it was impossible to get the rifle into working order, and, after gazing at us for a couple of minutes or so, the buck slowly trotted off, and was soon lost to view. My official work compelling me to move camp next morning, thus ended my experience of chiru shooting. I shall, however, never forget the beauty of these antelopes as I saw them through the glass when feeding on the Changchenmo plain.

VII.—THE SAIGA.

The northern limit of the chiru is probably marked by the great Kuen-Luen range, forming the frontier between Tibet and Eastern Turkestan, beyond which we enter the southern limits of the

range of another most remarkable and nearly allied antelope—the saiga (*Saiga tartarica*). This curious animal, of which the skull is shown in Fig. 35, has the swelling of the nose which we have noticed in the chiru so much more developed as to make the whole side of the face very deep, and to give a “Roman-nosed” profile to the whole head. More-

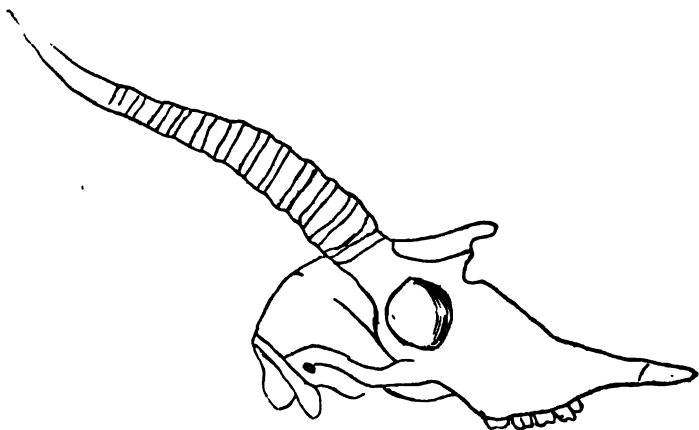


FIG. 35.—SIDE VIEW OF SKULL OF THE SAIGA. (After Gray.)

over, the nostrils, instead of opening forwards in the usual manner, have their apertures directed downwards, thus giving to the muzzle somewhat the appearance of a proboscis. In conformity with this extraordinary development of the nose, we find the nose-cavity in the dry skull (Fig. 35) of enormous size; this being most apparent by con-

trasting our figure of the skull of the saiga with that of the serow. The saiga shows a further point of difference from the chiru, in that it has a tear-bag, or gland, on the face. In height it stands about 3ft. at the shoulder. The horns, which are present only in the bucks, are about a foot in length, and are placed directly over the eyes, whence they arise almost vertically, diverging from one another in a lyre-like manner. They are ornamented with complete bold rings for about three-quarters of their length, and are remarkable for their beautiful amber-yellow colour—a tint, we believe, unknown elsewhere among the antelopes. The hair of the saiga is soft and thick, and completely covers the muzzle, its general colour being tawny yellow in the winter dress and light grey in summer. The general appearance of the animal is heavy and clumsy, and more like that of a sheep than a gazelle, although the affinities of the creature are with the latter group of antelopes.

The saiga offers many points of interest to those who study the present and past distribution of animals, and the inferences which may be deduced therefrom as to the climate and conditions of different parts of the earth's surface at former periods of its history. At the present day it inhabits only the so-called "steppes" of Western Asia and

Eastern Europe, characterised by their arid climate, and barren, sandy, and salt soil; and in such regions saigas are frequently met with in extensive herds. Its headquarters are now the steppes of Southern Russia and south-western Siberia as far east as the river Irtysh; and it may be regarded as, *par excellence*, the characteristic mammal of the Kirghiz steppes. A century ago its western range embraced the eastern borders of Poland, but of late years it has been gradually retreating towards the eastern side of the Volga. From south-west Siberia the saiga wanders in summer so far northwards along the eastern flank of the Urals as to come in contact with the southern winter range of the reindeer, a circumstance which, as will be seen later, is of considerable importance. In winter, on the other hand, it ranges as far south as Turkestan, and thus trends on the range of the Persian gazelle.

In regard to the nature of the typical south Russian and south-west Siberian steppes, lying between the lower and middle part of the course of the rivers Volga and the Irtysh, which are the favourite haunts of the saigas, it may be observed that, although large areas consist of undulating sandy tracts, other parts are rocky, while others carry considerable forests. To the northward these steppes pass into the "tundras" of Arctic Siberia,

inhabited by the reindeer, the glutton, the Arctic fox, and, in Arctic America, the musk-ox. The climate of the typical steppes is of the so-called Continental type; characterised by the extreme heat of the summers and the intense cold of the winters. The severity of the winter cold is, however, somewhat mitigated in those regions near which there are forests. In addition to the saiga, some of the more characteristic mammals of the steppes are jerboas (of the genus *Alactaga*), susliks, the bobac marmot, the mole-rat, the manul cat, and the wild ass.

Having stated thus much as to the present range of the saiga and the countries which it inhabits, we proceed to inquire as to what evidence there is that in former periods of the earth's history it roamed over a wider extent of country. We have seen that, so far as historic evidence goes, Poland appears to mark the extreme western limits of the saiga's range. It is, indeed, only thus far to the west that the country has any approach to a steppe-like character. If then, we find that the saiga was formerly widely spread over Western Europe in past times, it has been thought that we may be justified in considering that at least some portions of that area must then have had a more or less steppe-like appearance and climate, since other

conditions would be unsuitable to its existence. It does not, however, follow that the whole area over which saiga remains have been found was necessarily steppe-like, since these animals, like their living representatives, may well have wandered in summer and winter into districts having a somewhat different character and climate. If any doubt exist as to the former prevalence of the steppe-like conditions in western Europe at the period alluded to, it seems to be dispelled by the occurrence there not only of saigas, but also of many other mammals, such as the jerboa, suslik, and the bobac marmot, which are now exclusively confined to the steppes.

The period when saigas ranged over western Europe was the latter part of the so-called Pleistocene division of the Tertiary, or latest geological epoch, at a date considerably after the intense cold of the height of the glacial period had passed away, although when the climate was still of sufficient severity to permit the existence of herds of reindeer (at least, in winter) on the plains of the south of France and other regions of southern Europe.

The parts of central or western Europe where we should naturally expect to discover remains of fossil saigas would, of course, be either Poland or Germany; one being the country in which

the creature has occurred within the historic period, while the other is immediately adjacent to the western limit of its recorded range. According to Dr. Nehring, of Berlin, who has done so much to advance our knowledge of the Pleistocene mammals of Europe, bones of saigas have actually been found in a fossil state in Poland. In Germany, however, it does not appear that saiga remains have been definitively recognised, although Dr. Nehring is of opinion that some of the undetermined bones of ruminants obtained from the superficial deposits of that country will eventually prove to belong to this antelope. The occurrence, however, in these deposits of remains of the Siberian jerboa apparently attests the former prevalence of steppe-like conditions within the limits of the German empire.

A more southerly extension of the range of the saiga is, however, indicated by the discovery of its remains in a cavern in Moravia. The lower jaws of this animal differ from those of the existing saiga by their somewhat greater size, and also by the presence of six, instead of only five, grinding teeth. This leads Dr. Nehring to consider that the Moravian saiga may belong to a species different from the living one. Still further southward, remains apparently referable to the saiga have been discovered in the vicinity of Kaschau, on the river

Hernad, near the northern frontier of Hungary. Passing westward, we have indisputable evidence of the former existence of this antelope in Belgium, as well as in several districts of France, where its remains have been found in caverns. In the last-named country, the most northerly department which has hitherto yielded these remains is the Vienne, in the latitude of Central Switzerland ; while, more to the southward, they have been met with in the Dordogne, the Tarn-et-Garonne, and the Haute-Garonne, the latter impinging on the Spanish frontier. The saiga remains obtained from the French caves have been described by Professor Gaudry, of the Paris Museum, and comprise not only fragments of the skull and the horn-cores, but also numerous jaws, teeth, and bones of the limbs. Although the inclination of the horns to the skull differs in these fossil specimens to a slight degree from that observable in recent examples, yet there can be no room for doubt that the French saiga is specifically identical with the Russian one. That saigas were familiar to the ancient human inhabitants of southern France is proved by a rude, although recognisable, sketch of a saiga's head cut on a fragment of bone found in one of the caverns of that district.

Both in Belgium and France remains of saigas have been found in association with the antlers and

bones of reindeer, occurring at that particular epoch which, from the abundance of the fossil remains of the last-named animal, is known as the reindeer period. The other remains found in France with the saigas include bones of the brown bear, the wolf, fox, hare, rabbit, bison, stag, and ibex, with a few of those of the mammoth. We have already seen how, at the present day, the summer range of the saiga and the winter one of the reindeer overlap on the eastern flanks of the Urals, and there is accordingly nothing surprising in finding the remains of both these animals side by side in the south of France during the Pleistocene period. It is, however, quite permissible to suppose that, while the saiga may have always remained in those regions during the period in question, the reindeer was only a winter migrant to such southerly latitudes. Within historic times, the lowest southern limit of the range of the reindeer appears never to have extended below the neighbourhood of Orenburg, in latitude 52° , so that the climate of Europe must then have been very different from its present condition. With such a formerly extensive westward range, it would be almost inconceivable to suppose that the saiga had never lived within the limits of the British Islands. Curiously enough, however, no decisive evidence on this point was

obtained till 1890, when Dr. J. R. Leeson, of Twickenham, was fortunate enough to obtain a nearly perfect frontlet and horn-cores of a male, dug up from the superficial deposits of that place. This interesting specimen has recently been described and figured by Mr. A. Smith Woodward, of the Natural History Museum, in the Proceedings of the Zoological Society ; and is now exhibited in the Museum. It was found in a sandy layer about 7ft. below the surface ; the series of beds from which it was obtained consisting of 10ft. of alternating layers of gravel and sand, capped by 2ft. of loam. Unfortunately, no other mammalian remains have hitherto been obtained from these beds, so that we are in the dark as to the contemporary British mammals. The total absence of the remains of the saiga and reindeer from the brick-earths of Ilford, which yielded such a number of mammalian bones and teeth to the researches of the late Sir Antonio Brady, coupled with the comparative abundance of reindeer bones in the neighbourhood of Brompton and Kew, suggests, however, that the period when the saiga and reindeer inhabited Britain was later than that when the rhinoceroses and mammoths of Ilford roamed through the ancient forests of the Thames valley. It has, moreover, still to be shown whether the English saiga indicates the

former existence in Britain of steppe-like conditions, or whether it may have merely been a casual summer wanderer from the old steppes of central Europe. The rarity of this animal in the English deposits is, however, decidedly in favour of the latter alternative.

Unfortunately, we know nothing of the lower jaw of the English saiga, so that we are unable to state whether it resembled the Moravian one in having six grinding teeth, or whether, like the existing form and that found in the French caves, it had only five.

The saiga is hunted on horseback by the Kirghiz, and, although it makes a sharp burst at starting, it soon becomes "blown." We have not come across any accounts of saiga hunting by British sportsmen.

VIII.—GAZELLES.

The gazelles, constituting the genus *Gazella* of zoologists, form an extensive group of small or medium-sized antelopes characterised by their elegant and delicate build, small pointed hoofs, sandy colour, and large liquid eyes. They are distributed throughout Africa and Asia, generally in more or less completely desert regions, and are restricted to the continents, the number of species

inhabiting Asia being seven. Most of them have a small "tear-bag," and there is also generally a tuft of longish hair on each knee. The horns, except in three of the Asiatic species,* are present in both sexes, and are then much smaller and simpler in the does than in the bucks. In the latter they are generally (and among the Asiatic species invariably) of but moderate length, with a more or less pronounced S-like curvature, and a lyrate or scimeter-like form. They are always much compressed from side to side, so as to present an oval cross-section; and they are ornamented with a number of complete rings, which continue nearly to their tips. A very characteristic feature in the coloration of the gazelles,† and one by which their skins may always be recognised, is to be found in the presence of a white streak running across the cheek from the outer side of the base of each horn nearly as far as the upper extremity of the nostril, this streak thus cutting off a dark triangular patch in the centre of the face, and being itself bordered by a diffuse dark line. By many zoologists the Asiatic gazelles have been referred to three distinct

* In Clarke's gazelle and Waller's gazelle of Africa, the females are hornless, but these do not belong to the genus *Gazella*.

† Except the goa, or Tibetan gazelle.

genera, and this arrangement is followed in several works on sport. The best modern zoologists are, however, now agreed in including the whole of them in one genus, which has the great advantage of giving us fewer names to recollect.

The best known of all the Asiatic species is the common chinkara, or Indian gazelle (*Gazella bennetti*), first described as a distinct species by Colonel Sykes in 1831. We have already had occasion to allude to the extraordinary misnomers applied by sportsmen to so many animals; but in no case is the misapplication of names so exceedingly marked as in the instance of the Indian gazelle, which among Anglo-Indians is commonly known as the ravine-deer. If there are two groups of animals which one would have thought unlikely to be confounded, they are antelope and deer. In Madras, the chinkara is commonly known as the goat-antelope, but this name properly belongs to the serow and its kin.

The Indian gazelle is characterised by the presence of horns in both sexes, and by those of the males being sub-lyrate in form—that is to say, without their tips being inclined inwards, the absence of a white patch on the rump being also an important characteristic. The general colour of the animal is light chestnut, becoming darker near the junction

of the white of the flanks and buttocks. The male stands about 26in. in height at the withers, and the average length of the horns, measured in front along the curve, is from 10in. to 12in., although a length of 14in. has been recorded. As a rule, each horn carries about fifteen or sixteen rings; but it is said that as many as twenty-five rings have been counted.

The range of the chinkara is extensive, the creature being found in suitable localities, according to Mr. Blanford, throughout the plains and low hills of North-Western and Central India, and thence extending to the westward through Baluchistan to the eastern shore of the Persian Gulf. It is also widely distributed in Peninsular India, being found throughout the Punjab, Sind, and the Bombay Presidency, and in Madras to some distance south of the Kistna river. It does not appear in Baluchistan and Persia to ascend to a greater elevation than 3000ft., or thereabouts. In the great Indian Desert and Sind, the chinkara becomes of a rather paler tint than usual. A female from Jalk, in northern Baluchistan, characterised by its distinctly ringed horns and the dark brown colour of the darker portions of the face, was at one time considered to indicate a distinct species, and described as *Gazella fuscifrons*, but is now shown to be merely a variety.

Chinkara are generally found in parties of from two to six, but Messrs. Jerdon and Blanford state that they have seen them in herds of from ten to twenty individuals. They frequent barren, desert regions, and more especially such as are much cut up by ravines; but are rarely seen on cultivated lands, although they may be found in thin jungle. From the circumstance that the species is found in regions where the only water is contained in deep wells, and that in other districts its "spoor" is not found leading down to the streams and other sources of water, Mr. Blanford is of opinion that the chinkara never drinks, which, if confirmed, is certainly most remarkable in a creature inhabiting such hot and arid regions. As Mr. R. A. Sterndale remarks, the chinkara "is a wary and restless little beast, and requires good shooting, for it does not afford much of a mark." The same writer remarks that these gazelles may be more readily approached by simulating the appearance of a native, or, still better, by making use of the proverbial stalking horse or bullock. Like the Indian antelope, the chinkara can but rarely be run down fairly by dogs; but, by taking the somewhat unfair advantage of the aid of falcons, they may be so confused as to fall a ready prey to the dogs.

That gazelles have long inhabited India is proved

by the occurrence of the fossil species, of which the frontlet and horn-cores are shown in Fig. 36, in the Siwalik rocks of the Punjab. That species was considerably larger than the chinkara, and may have been allied to the long-horned Grant's gazelle of

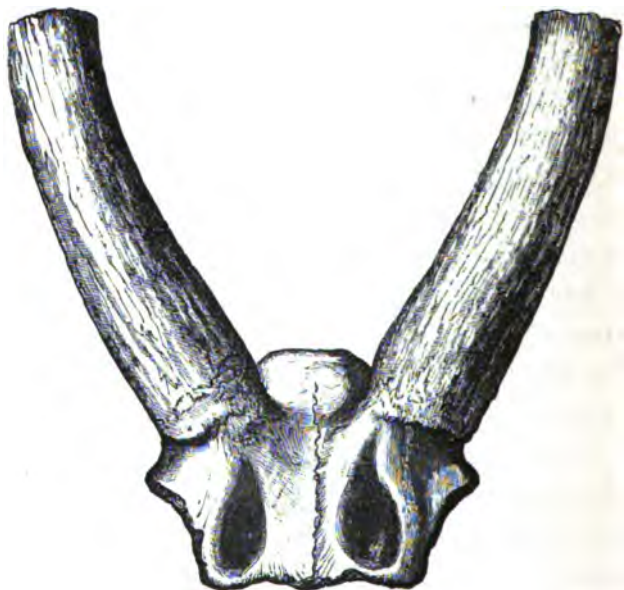


FIG. 36.—FRONTLET AND PORTIONS OF THE HORN-CORES OF FOSSIL INDIAN GAZELLE.

East Africa. As other fossil species occur in the Tertiary rocks of Europe, we have good reason to believe that the original home of the gazelles—like that of so many other antelopes—was in Europe and Asia, from whence they migrated into Africa,

where they are now represented by considerably more species than in Asia. The figure exhibits the deep pits in the forehead, just below the bases of the horns, which are characteristic of the skulls of gazelles, and some of the allied groups of antelopes.

In South Arabia we have the Arabian gazelle (*Gazella arabica*), which is nearly related to the chinkara, but is usually not more than about 24 in. in height at the withers. In colour, the back and sides are grizzled bay, while the under-parts are paler; and the central band down the face is a rich bay above, but darker below, so as to form a marked spot on the nose. The horns of the bucks are massive, with the rings far apart; they diverge gradually for about two-thirds their length, and more decidedly in the upper third, their tips inclining slightly forwards. The ears are of moderate size. The Arabian gazelle is very numerous in some parts of South Arabia, and its habits appear to be very similar to those of the Indian species.

A third species of this group, the Muscat gazelle (*Gazella muscatensis*), is also found in South Arabia. It is closely allied to the preceding, but differs somewhat in coloration. As mentioned in the introductory paragraphs of this article, the present and

preceding species belong to an area whose fauna is most akin to that of Africa, and where antelopes belonging to genera otherwise exclusively African occur.

The last of the Asiatic gazelles in which the females are horned is the Dorcas gazelle (*Gazella dorcas*). This is, indeed, properly an African species, inhabiting Egypt and Algeria; but it is also found in Western Asia, where it has been recorded from Asia Minor (near Tarsus), Syria, and Palestine. It is readily distinguished from the three preceding species by its distinctly lyrate horns, in which the tips are turned inwards and slightly forwards. It stands barely 24 in. inches in height at the shoulder, and its horns are comparatively long and slender. Canon Tristram tells us that small herds of this gazelle are to be found in every part of Palestine, and in some districts they may be met with in herds comprising 100 individuals. It is also found both in the open country and in scrub.

With the Persian gazelle (*Gazella subgutturosa*) we come to the first of a group of three species peculiar to Asia, and characterised by the absence of horns in the females. The present species agrees closely in size with the chinkara, and is of a rufescent sandy colour above, without a white patch on the rump surrounding the tail. The horns are

black, only slightly curved, and distinctly lyrate, with the tips turned inwards, and their rings are prominent, and from sixteen to twenty-five in number. Mr. Blanford states that the longest horns which have come under his notice were obtained from Herat, and measured just over 14½ in. in length. We must not omit to mention that this gazelle has a distinct tear-bag below the eye.

The Persian gazelle is essentially an animal of the highlands, and has a larger range than any other of the Asiatic antelopes. It is found throughout the highlands of Persia, at elevations of from about 3000ft. to 7000ft., and thence extends to Candahar and Afghanistan; but, according to Mr. Blanford, only enters British India in the Pishin valley, north of Quetta. In Central Asia it ranges over an enormous area of country, extending through Eastern Turkestan into the great Gobi desert. The Turkestan race—of which examples were brought by the members of the Yarkand expedition, under the late Sir Douglas Forsyth—is rather larger than the typical Persian form. It has been well described and figured by Mr. Blanford in his account of the mammals of the expedition.

The late Sir Oliver B. St. John, as quoted by Mr. Blanford, writes that “this is the common gazelle of Persia, and is found everywhere away from the

forests of the Caspian and the shores of the Gulf, in which last locality it is replaced by another species, probably *Gazella bennetti*. Like the wild ass, it especially affects the neighbourhood of the salt deserts. It appears to retire generally to the valleys at the base of the hills to breed, and is most commonly seen in small parties of three to half a dozen. I do not remember ever having seen twenty together. The fleetest greyhounds cannot come up with the gazelle when it gets a fair start, but when suddenly roused from a hollow, or when the ground is heavy after rain, good dogs will often pull down males. The does are more difficult to catch." In Persia this gazelle is known as the ahu—a name applied in Baluchistan to the chinkara.

Closely allied to the preceding is the tseain or Mongolian gazelle (*Gazella gutturosa*), of the desert regions of portions of Mongolia. It is readily distinguished by its considerably larger dimensions, standing as much as 3oin. at the withers, and also by its relatively shorter and very pale-coloured horns, in which the rings are but faintly marked, and the curvature very slight. It has also a whitish patch surrounding the very short tail, of which the base is white and the tip fawn coloured. Like the Persian gazelle, this species has a long coarse coat in winter, while in summer it is short and fine. The colour of

the upper parts of the winter dress is a grizzled fawn, replaced in summer by an isabelline yellow.

The habits of the Mongolian gazelle are probably very similar to those of the Persian species; but our knowledge of the animals of Mongolia in their native haunts is but slight, Mr. Ney Elias, who traversed the Mongolian deserts some years ago, not being, unfortunately, a naturalist, and, therefore, having given us no account of the fauna of the country. Fossil remains of a gazelle recently described from Mongolia, appear to indicate a species nearly allied to the living one, and thereby indicate that this group of gazelles has been long native of Central Asia.

The last of the gazelles, and, at the same time, of the Asiatic antelopes, is the pretty little goa, or Tibetan gazelle (*Gazella picticaudata*), which appears to inhabit the greater part of the Tibetan plateau, at elevations of from about 13,000ft. to 18,000ft. above the sea level. Among sportsmen this species is not unfrequently mentioned under the misnomer of the Tibetan ravine-deer. The goa, which stands about 24in. at the shoulder, is characterised by the presence of a white patch surrounding the tail, of which the tip is dark brown or black; and also by the form of the horns, the latter being distinguished by their slender form, and

the great backward curvature of their bases and forward inclination of the tips, which are but slightly turned inwards, as well as by the number of the faintly marked rings, which is usually from twenty-five to thirty in the adult. Further characteristic points are to be found in the absence of a tear-bag on the face, as well as in the want of the coloured markings on the same, which are found in all the other gazelles. The hair is long and soft in winter, when it is of a light sandy fawn colour; but with the assumption of the shorter summer dress the tint changes to a greyer hue. The horns are usually about 11 in. or 12 in. in length, measured along the curve, but a length of $15\frac{3}{4}$ in. has been recorded.

Goa are usually met with in small parties of from two or three to ten or a dozen, and are found along the Indus valley, in Ladak, from the village to Nimu, below the town of Leh to the frontier of Tibet, beyond which the sportsman cannot penetrate, except for a short distance by stealth. They are common, according to Gen. Kinloch, in the neighbourhood of the Tsomoriri lake, to the eastward of Hanle, in Spiti, at an elevation of nearly 15,000 ft.; and they have also been obtained from that part of Tibet lying to the north of Sikkim. The present writer, when in Ladak, never had the good fortune to come across goa; but they are

described by Gen. Kinloch as not very shy, and but little frightened by noise. They generally frequent open, undulating ground, in preference to more rocky districts.

A somewhat unusual experience in Himalayan shooting is recorded by Gen. Macintyre in the neighbourhood of Hanle. He had been pursuing a doe goa for some time, but had been unable to obtain a shot, owing to the animal continually disappearing from view behind intervening ridges. "This sort of thing," writes the General, "had happened for the third or fourth time, and I just topped a rise over which she had gone, when, instead of seeing the doe, up sprang two fine bucks from a hollow in front. As I felt pretty sure that before going far they would stop to look back, I instantly lay down, got my elbows well planted on the ground, and the rifle levelled for a steady shot. Sure enough, they pulled up at about 100 yards. There was little to choose between them, so I took the one which offered the better mark, and dropped him on the spot. The other trotted on some 20 yards, and then turned to look back for his companion. I had only his chest to aim at, but fortune again favoured me, for he, too, went down, never to rise again. Great was the astonishment of my Tartar companions when, on coming up, instead

of finding, as they expected, that I had shot the doe, or perhaps missed her, I showed them a dead buck; and still greater was it on my pointing out a second lying within 20 yards of him, for their surprise was so great at seeing even one dead buck that they had never thought of looking for another."

In concluding this survey of the antelopes of Asia, it will be useful to give a list of the various species in the order mentioned, with the chief habitat of each:—

1. SEROW (*Nemorhædus bubalinus*), Himalaya.
2. CAMBING-UTAN (*N. sumatrensis*), Eastern Himalaya, Eastern Tibet, Malay Peninsula, &c.
3. JAPANESE GOAT-ANTELOPE (*N. crispus*), Japan.
4. SWINHOE'S GOAT-ANTELOPE (*N. swinhoei*), Formosa.
5. GORAL (*Cemas goral*), Himalaya.
6. GREY GOAT-ANTELOPE (*C. grisea*), Eastern Tibet.
7. ASHY GOAT-ANTELOPE (*C. cinerea*), Eastern Tibet.
8. LONG-TAILED GOAT-ANTELOPE (*C. caudata*), North China.
9. TAKIN (*Budorcas taxicolor*), Mishmi Hills and Eastern Tibet.

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10. NILGAI (*Boselaphus tragocamelus*), India.
 11. FOUR-HORNED ANTELOPE (*Tetraceros quadricornis*), India.
 12. BLACK-BUCK (*Antilope cervicapra*), India.
 13. CHIRU (*Pantholops hodgsoni*), Tibet.
 14. SAIGA (*Saiga tartarica*), East Europe and West Asia.
 15. INDIAN GAZELLE (*Gazella bennetti*), India and Baluchistan.
 16. ARABIAN GAZELLE (*G. arabica*), South Arabia.
 17. MUSCAT GAZELLE (*G. muscatensis*), South Arabia.
 18. DORCAS GAZELLE (*G. dorcas*), Asia Minor, Syria, and North Africa.
 19. PERSIAN GAZELLE (*G. subgutturosa*), Persia, Afghanistan, Turkestan, &c.
 20. MONGOLIAN GAZELLE (*G. gutturosa*), Mongolia.
 21. TIBETAN GAZELLE (*G. picticaudata*), Tibet.
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CHAPTER V.

AFRICAN ANTELOPES.

AFRICA, it need scarcely be said, is now the headquarters of that group of hollow-horned ruminants collectively known as Antelopes. In Dr. Gray's "Catalogue of Ruminant Mammals," published in 1872, out of 101 species of antelopes no less than eighty-one are entered as African. It is true, indeed, that some of the African species recognised in that list have since proved to be invalid, the number in the "Hand List," published in the succeeding year, being reduced to seventy-eight; yet, as others have been subsequently added, the proportion is really somewhat below the truth, the total approximate number of African species being between ninety and a hundred. This great preponderance of antelopes in Africa is, however, to a considerable extent, a feature of the present epoch, since a number of fossil antelopes of African types are found in the Pliocene, or Upper Tertiary, rocks, both in Southern Europe and Northern India. This leads to the conclusion

that this group of ruminants was once spread over the greater part of southern Europe and Asia, from which area (owing partly to climatal changes) they have to a great extent disappeared; and, having gained a footing in Africa, have developed in the open plains of the southern central, and eastern regions of that continent to a degree unparalleled among any other group of animals. Moreover, with the exception of the gazelles, which are desert-loving animals found over a large portion of the Old World, wherever suitable conditions exist, the whole of the genera of African antelopes are practically confined to that continent, although one of the gemsboks, the bubaline antelope, and the addax also range into the adjacent regions of Syria and Arabia.

Although we are all more or less familiar with antelopes, the definition of an antelope, as distinct from other groups of the hollow-horned ruminants, is not only extremely difficult, but almost impossible; since the so-called goat-antelopes, such as the well-known Alpine chamois and the Himalayan serow, approximate, as we have seen in the last chapter, so closely to the goats, that no hard and fast line—especially when we take fossil forms into consideration—can be drawn between the two. On the other hand, certain antelopes, such as the gemsbok and

sable antelope, approximate in the structure of their skulls and the massiveness of their grinding-teeth to the earlier extinct representatives of the oxen, so as to suggest that there was at one time a complete transition from antelope to oxen. Indeed, since geology teaches us that antelopes are the oldest known representatives of the entire group of hollow-horned ruminants, it is probable that we must look upon the earlier extinct species as closely related to the original common stock from which oxen, antelopes, goats, and sheep have subsequently diverged.

In spite, however, of this difficulty of defining an antelope, to which allusion has already been made in the foregoing chapter, it will be well to glance at some of the leading features of the group as a whole before proceeding to the subject of this chapter. Antelopes, then, are hollow-horned ruminants, frequently of very graceful and elegant build, in which the males are always, and the females often, provided with horns. The horns are very frequently more or less lyrate in shape, with a sub-circular cross-section, and an upward direction. They may, however, be nearly straight, as in the gemsbok; curved backwards, and marked by bold rings, as in the sable antelope; ridged and spirally twisted, either on their own axis, as in the eland, or in a corkscrew, as in the kudu; or sharply bent

down and then upturned, as in the gnu. In no case, however, do the horns assume the characteristic form and curvature of those of the true goats or sheep. The frequent presence of a tear-bag, or crumen, below the eye serves to distinguish the antelopes as a whole from the oxen. As a rule, the grinding-teeth of the antelopes have comparatively tall crowns, but in the kudu and its allies they are low and broad. Great differences exist in regard to the structure of these teeth; so that the characters afforded by them are of considerable importance in classification. Thus, in the gazelles, the grinding-teeth are comparatively narrow, and have no additional column between the two main inner columns of those of the upper jaw, so that they resemble those of the goats and sheep. But in the gemsbok, sable antelope, &c., these teeth are exceedingly broad and tall, with a large additional column on the inner side of those of the upper jaw, as in the oxen.

With regard to African antelopes, it is unfortunate that the difficulties which they present when any attempt is made to systematic arrangement, have led to considerable discrepancy of view as to the number of genera and species into which they should be divided. As already mentioned, the African antelopes known to Gray in 1872 were

referred to eighty-one species, arranged in thirty-one genera. Many of these so-called genera were, however, established on very trivial and unimportant characters, and by general consent many of them have been discarded, although entire unanimity has not yet been reached as regards the advisability of rejecting others. Recent researches, especially as regards the antelopes of Somaliland and East Africa, have led to the recognition of several well-marked species which were unknown at the time Gray's catalogue was published, most of these new species having been described either by Sir Victor Brooke, Mr. Sclater, or Mr. O. Thomas.

Still, however, there is much yet remaining to be done before our knowledge of the African antelopes can be regarded as complete; and it is much to be hoped that the national collection at South Kensington, which already contains a magnificent display of these ruminants, may be enriched by a still fuller series of specimens of the rarer kinds before their final extinction, which it is to be feared in several cases is merely a matter of time—and that not a very distant one. It will be seen, as we proceed, that the antelopes of the western side of the continent generally differ, more or less markedly, from those on the east; but as we become more fully acquainted with those inhabiting the central

equatorial regions we may expect to find that they connect the species of the two coasts.

Irrespective of the numerous papers published of late years in the journals of various scientific societies, both British and foreign, the more recent works containing the most important information—more especially from the sportsman's point of view—are the following, viz. : The Hon. H. Drummond's "Large Game and Natural History of South and South-east Africa" (1875), Mr. F. C. Selous's "A Hunter's Wanderings in Africa" (1881), Sir J. Willoughby's "East Africa and its Big Game" (1889), and Messrs. Nicolls and Eglington's "The Sportsman in South Africa" (1892). For the antelopes of Abyssinia the reader may refer to Mr. W. T. Blanford's "Geology and Zoology of Abyssinia" (1870).

In endeavouring to give a brief sketch of the African antelopes at present known sufficiently well to be at least provisionally admitted as species, we shall in the first place point out the larger groups into which these animals may be divided, and then follow with the genera and species belonging to such groups, generic terms being generally employed in a wide sense. The importance of a correct and uniform nomenclature in matters of this kind can scarcely be over-rated, since, owing to a neglect of

this point, it is in some cases almost impossible to know what species are referred to in some works of travel and sport, and much valuable information on their habits is consequently lost or marred. Most of the better-known species have been figured many times over, but in the case of some of those recently described, references will be given where they are figured. The larger groups into which the African antelopes may be divided are six in number, and are as follows, viz. : (1) Hartebeests, blessboks, and gnus ; (2) duikerboks ; (3) the group including Salt's antelope, the royal antelope, the steinbok, rhebok, water-buck, reitbok, and their allies ; (4) palas and gazelles ; (5) sable antelope, blaubok, gemsboks, and the addax ; (6) harnessed antelopes, kudus, and elands.

I.—HARTEBEESTS, BLESSBOKS, AND GNUS.

The species included in the first group are mostly characterised by their great height at the withers, and are frequently clumsily built and ungainly in appearance (Fig. 37). The horns are present in both males and females, and are either ringed and more or less lyrate, or smooth and bent backwards, with their bases placed rather close together. The upper grinding-teeth are tall and very narrow. The

body is mostly of a uniform colour, but there may be a yellowish blaze on the rump, and all the species are of large size. The skull has no large pits above the eyes ; nor any unossified vacuities in the face. The hartebeests are characterised by their long and pointed muzzles, ringed and often lyrate horns, the



FIG. 37.—THE HARTEBEEST.

want of any mane on the neck or throat, and the relative shortness of the tail, which is never very bushy.

The smallest of the hartebeests is the titel or bubaline antelope (*Bubalis mauritanica*) of North

Africa, Syria, and Arabia, a species of very ungainly build, of a uniform bay colour, with an extremely long face, and the lyrate horns perched at the very summit of the head, considerably above the ears. The horns are comparatively short and thick, ringed nearly to the summit, and not bent quite at a right angle; their length scarcely ever exceeding 14in. Differing mainly by its vastly superior size is the very imperfectly known Tunisian hartebeest (*B. major*), with horns exceeding 20in. in length, and of proportionately large girth. In South Africa these species are replaced by the true hartebeest (*B. cama*, Fig. 37), standing about 4ft. at the withers, with the general colour reddish-brown, but a yellowish spot on the rump, a black band down the face, and the front of the legs also marked with black. The horns are long, very boldly ringed, and diverge in the form of a V, instead of in the more U-like shape of those of the two preceding species. Their bases curve away behind the plane of the forehead, and their tips are bent backwards at right angles. The recently-discovered Jackson's hartebeest (*B. jacksoni*), from the Victoria Nyanza district, differs by the absence of the dark streak on the face, as is well exhibited in the figure published in Mr. Rowland Ward's "Horn Measurements." Its horns may reach a length of 23in. along the curve.

Markedly distinct from all the above is a group of three species characterised by their widely divergent horns. The first of these is Cooke's hartebeest (*B. cookei*), from the east coast, near the Mpawpa Mountains and Lake Victoria Nyanza. The upper parts are reddish-brown, passing to greyish-brown



FIG. 38.—HORNS AND SKULL OF COOKE'S HARTEBEEST. (After Günther.)

below. The horns (Fig. 38) diverge so much at the bases as to form a right angle with the middle line of the face; their bases are almost in the plane of the face, and the tips, which are not ringed, are bent at right angles to the base, and directed immediately backwards. This species has the front

of the face of a dark rufous tint ; but in the allied tora antelope (*B. tora*), of the Sudan and parts of Abyssinia, the face is of the same isabelline tint as the body, while the horns are longer and more divergent ; these characters being well shown by the figure given by Mr. Sclater in the *Proc. Zool. Soc.*, 1873, p. 762. The third representative of the group is the sig, or Swayne's hartebeest (*B. swaynei*), from the highlands of Somaliland, which is one of the most recent additions to the list of African antelopes. As shown in the accompanying figure of the head (for which we are indebted to Mr. Rowland Ward), it is readily distinguished by the dark purplish streak down the centre of the face, which forms a marked contrast to the general chestnut-red hue ; as well as by the massive and widely-spreading horns, of which the smooth tips are directed immediately backwards. Captain Swayne's interesting account of this species will be found in the *Proc. Zool. Soc.* for 1892. The konzi or Lichtenstein's hartebeest (*B. lichtensteini*) is an East African species, ranging as far inland as Nyassaland, and dwelling in flat or hilly wooded areas. Its horns are short, with their bases much wider and more flattened than in the preceding species, the rings only occurring at the bases, and the tips directed backwards. It is of a pale brown

colour, with the back and upper part of the neck darker, a black tip to the tail, and black markings on the front of the legs. It is stated that the true Lichtenstein's hartebeest has no light patch on the



FIG. 39.—HEAD OF SWAYNE'S HARTEBEEST.

rump, and the form in which there is a yellowish disc in this part has accordingly received a distinct name* (*B. leucoprymnus*). It cannot yet, however,

* Matschie, *Sitzber. Ges. Nat. Freunde, Berlin*, 1892, p. 137.

be determined whether this is a valid specific difference.

The species now to be mentioned differ to a greater or less extent from the preceding ones by the relatively shorter face and the lower position of the horns, as well as in the form of the horns themselves, and there has accordingly been a difference of opinion as to whether they should be included in the genus *Bubalis*, or should constitute a distinct genus under the name of *Damalis*. The characters of Hunter's antelope are, however, so nearly intermediate between those of the preceding species and those of the other species to be immediately mentioned, that in our opinion the former view should clearly be adopted. In all of them the withers are much less elevated in proportion to the rump than in the species which we have already considered.

Hunter's antelope (*B. hunteri*, Fig. 40), has been comparatively recently discovered, and inhabits the lower portion of Somaliland lying on the east coast north of the Tana (or Dana) river as far as Kismayu. It stands 4ft. in height at the shoulder, and is of a uniform chestnut-brown colour, with a white tail and belly, a characteristic white chevron between the eyes, which are ringed with white, and the inside of the ears also white. The horns, after inclining out-

wards, run vertically upwards, with a large part of the extremity quite smooth, their length being about 24in. The face is comparatively long. The whole animal, as well as the head and horns, are figured by Mr. Sclater.* The allied korrigum, or Senegal hartebeest (*B. korrigum*) appears to range right across Central Africa, from Senegal on the west to southern Somali-land on the east, being very abundant in parts of the Upper Nile basin. It is readily distinguished from Hunter's antelope by the some-

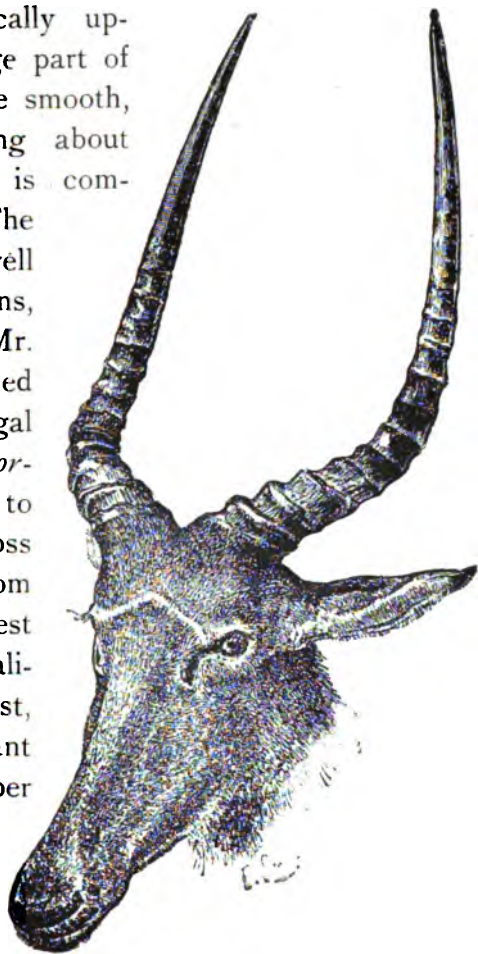


FIG. 40.—HEAD OF HUNTER'S ANTELOPE.
(After Sclater.)

* *Proc. Zool. Soc.*, 1889, p. 372.

what shorter face, which has a broad black band down the middle, without the white chevron, or rings round the eyes, and also by the shorter horns, which have not the long straight terminal portion of the latter, and are ringed nearly to their summits. A figure of the head is given by Mr. Sclater.* Both the korrigum and Hunter's antelope are said to frequent open grassy plains, although occasionally found in scrub, and go in herds of from ten to twenty individuals.

The well-known sassabi (*B. lunata*) is a South African species, standing some 3ft. 10in. in height, with horns about 12in. long, diverging widely from the base and then recurved, and a long tail, measuring nearly 2ft. The colour is purplish-brown above, becoming yellowish below, the rump fawn-coloured, and a slaty patch extending from the shoulder and the hip to the legs. Livingstone and others give the name as tsessebe. Mr. Selous has lately recorded a hybrid between the hartebeest and the sassabi.

The somewhat smaller blessbok (*B. albifrons*) and the bontebok (*B. pygarga*) are closely allied South African species, in which the compressed horns (Fig. 41) are more regularly lyrate, parallel

* *Proc. Zool. Soc.*, 1886, p. 176.

at their bases, and then curving backwards, their usual length being some 15in. Both are characterised by their violet colour and white faces; the blessbok being distinguished by the blaze on the face being divided by a dark line above the eyes, and the absence of any white on the rump above the



FIG. 41.—HORNS OF BLESSBOK.

tail, or on the throat, and front of the legs. The countless numbers in which these beautiful animals formerly roamed on the "veldt" of the Cape Colony is too well known to need more than passing mention. Finally, the name *Damalis jimeru* has

been applied by Herr Matschie* to an East African representative of this group, although further evidence is required before its right to specific distinction can be recognised.

Of the well-known gnus, wildebeests, or dauws,



FIG. 42.—HEAD OF BRINDLED OR BLACK-TAILED GNU.

which are the only remaining members of this group, and are remarkable alike for their grotesque appearance and their extraordinary antics, it is scarcely necessary to say more than that there are two

* *Sitzber. Ges. Nat. Freunde, Berlin*, 1892, p. 173.

species, both confined to the southern portion of the continent. These are the white-tailed gnu (*Connochætes gnu*) and the brindled or black-tailed gnu (*C. taurina*, Fig. 42); the distinctive characters by which the latter differs from the former being sufficiently indicated by its names. The brindled gnu, which is also known as the blue wildebeest, does not occur to the south of the Orange river, and ranges to the north-east as far as Lake Nyassa. In Uganda it is represented by a variety distinguished by its white mane.* The gnus, it may be mentioned, differ from the hartebeests by their smooth, downwardly-bent horns, broad muzzles, maned necks and throats, and bushy tails.

II. THE DUIKERBOKS.

The second group comprises only those small or medium-sized antelopes, known as duikerboks, constituting the genus *Cephalophus*, which was, however, unnecessarily divided by Dr. Gray into *Grimmia*, *Terphone*, and *Potamotragus*. They are sometimes known as bushbucks, but since this name is applied to one of the harnessed antelopes it is better avoided. It is perhaps almost superfluous to

* Thomas, *Ann. Mag. Nat. Hist.*, Vol. IX., p. 386 (1892).

mention that the name duikerbok properly applies only to the typical Cape species, but, as in the case of the hartebeests, it is convenient to make it include the whole group. The chief distinctive characters of the duikers are that the small straight horns are placed far back on the skull, and are present in both sexes; between them is a small crest or tuft of hair, from which the genus takes its name; and the tear-bag is very small, and opens on the face either in the form of a narrow slit, or in a series of minute pores. Moreover, the naked portion of the muzzle is very large, and the tail extremely short. The upper grinding-teeth have broad and nearly square crowns. The build of most of the species is light and graceful, and the colour generally uniform, although the zebra antelope forms a marked exception in the latter respect. There has been great difficulty and obscurity as to the number of species of duikers, Dr. Gray's list of 1872 giving the number as twenty-three, not including the zebra antelope, and two more were added by him in 1873, and several more by other writers in subsequent years. Recently, however, Mr. Thomas* has undertaken a careful revision of the groups, with the result of reducing the number of species to eighteen,

* *Proc. Zool. Soc.* 1892, p. 413.

since which another species has been described by himself, while four others, which may or may not prove to be distinct, have been added by Herr Matschie. Although the typical South African duikers frequent bush-jungle or open country, the great majority of the species inhabit the dense tropical forests of the west coast.

Commencing with the species found in South Africa, we first notice the little blue-buck or pigmy antelope (*C. monticola* = *C. pygmaeus*, or *C. caeruleus*, as it is sometimes called), which is the smallest representative of the whole group, being not larger than a rabbit. It is easily recognised by its small size, bluish-grey colour, and the tiny straight horns, scarcely showing above the tuft of hair on the forehead, and its delicate rufous limbs. It is extraordinarily abundant in the Natal jungles, and a good description of its habits will be found on p. 392 of Mr. Drummond's book, where it is called the pete, or ipete. The duikerbok (*C. grimmi* or *C. mergens*) is a somewhat larger but equally common South African species, standing about 26in. at the shoulder, with somewhat longer and narrower ears, and typically of a yellowish-brown colour, with a more or less marked tinge of grey, although there seems to be great individual variation in this respect. It belongs to a group of three species charac-

terised by the horns, which are usually wanting in the female, starting upwards at a sharp angle with the plane of the nose, instead of being more or less nearly continuous therewith. The South African duiker described by Dr. Gray as *C. burchelli* can only be regarded as a variety of the duikerbok, which is of a more reddish-brown colour, with some dashes of black. Passing northwards into East Africa, we meet with an antelope which has been described as the Nyassa duiker (*C. ocularis*). This animal was said to be distinguished by the whitish colour of the belly. There appears, however, to be a considerable amount of individual variation in the general colour of the body, and it seems even difficult to fix upon a general term which shall correctly describe this. Mr Crawshay speaks of the colour ranging from a reddish-brown, with a tinge of green in some specimens, to almost dark red; while there is also some variation as to the degree of whiteness on the belly. Although Mr. Crawshay speaks of this duiker as never showing the decided grey of the typical form of the true duiker (*C. grimmi*), there can be little doubt that it is merely a local variety of that species. This variety seems to be very abundant in Nyassaland, except where the country is very open or very rocky. As was first pointed out by

M. du Bocage, the duikerbok ranges northward along the west coast into Angola.

The red-buck, or Natal duiker (*C. natalensis*), is a well-marked species, distinguished by its uniform bright reddish-bay colour, shorter and wider ears, and shorter horns, which are present in both sexes, and incline upwards in the plane of the nose. It is of medium size, standing about 20 in. in height. Mr. Drummond mentions that the tuft of hair on the head is larger than in the true duiker. This species is also far less common in Natal than the latter; its flesh is unpalatable; and, owing to the tremendous rushes which it makes when disturbed, it is exceedingly difficult to shoot. A good figure of this animal will be found in Dr. Gray's "Memoir on the Duikers," published in the P.Z.S. for 1871. The Kilima-njaro duiker (*C. spadix*) is an allied species of somewhat larger size, of a uniform chestnut-brown colour, passing into greyish-brown on the throat, chin, and face. Possibly *C. æquinoctialis*, Matschie,* from the Victoria Nyanza districts may be also allied.

Considerably further to the northward the duikers are represented in Abyssinia by the well-known madoqua (*C. abyssinicus*). This is one of the

* *Sitzber. Nat. Ges. Freunde, Berlin*, 1892, p. 112.

long-eared species belonging to the same group as the true duiker, and is of a grizzled greyish-brown colour, with the flanks grey, and the tufts between the horns reddish. The bucks stand from 21in. to 22in. in height at the shoulder. According to Mr. Blanford, this antelope is found at elevations of from 7000ft. to 8000ft., where it is not rare in bushes and small clearings; it appears to be generally solitary.

We now come to the West African duikers, two of which are much larger than any of the southern or eastern species; and it is in this region that we find the greatest number of species. Of the smaller forms the greater number are characterised by having dark markings either on the face or the middle of the back, or on both. The first of these is the black-faced antelope (*C. nigrifrons*), from the Gabun and Cameruns Mountains, which is of a bright reddish-bay, with a black line running down the middle of the face, but none on the back; and the outer sides of the fore legs dark coloured. The antelope from the Gabun, described by Dr. Gray as *C. aureus*, is only an unusually bright example of this species. Harvey's duiker (*C. harveyi*), from Kilima-njaro, differs by its paler bay ground-colour, becoming lighter below, the white chin, and the shorter hoofs. Another species from the Gabun,

known as *C. leucogaster*, differs by having a black stripe running down the back from the head to the tail; the general colour being dark chestnut, with the hams white, and the tail black and white with a tuft at the end. Nearly allied is the bay antelope (*C. dorsalis*), ranging from Sierra Leone to the Gold Coast, and distinguished by the absence of the white on the rump and the tuft to the tail. Ogilby's duiker (*C. ogilbyi*), from Liberia and the Cameruns, is easily distinguished by the central line of the face being not darker than the flanks, while the dorsal stripe starts only from the withers. The black-rumped duiker (*C. callipygus*) is a Gabun species easily recognised by the black tail and hams; while the coquetun (*C. rufilatus*) from Senegambia, differs from all the above in having the dark markings of a bluish-grey tint, instead of dark brown or black. It is of a deep reddish-bay colour, with a dark stripe down both the face and back.

The next species we have to mention is the zebra antelope (*C. doriae*) of West Africa, which is distinguished from all the other duikers, and, indeed, from all other antelopes, by its remarkable coloration. It was known to Dr. Gray only by a flat skin from the Gambia, which he described as *Damalis* (?) *zebra*. This beautiful animal—an excellent figure of which

will be found in a paper by Herr Jentink,* is of a bright golden-brown colour, with a number of transverse black bands crossing the back and loins, and gradually narrowing to a point on the flanks. The coloration of this antelope, although much brighter, forcibly reminds us of that of the Tasmanian wolf, or thylacine. The next three West African species differ from the above by their general colour being smoky brown or blackish, instead of some shade of fulvous, rufous, or chestnut, in which respect they approach the smaller blue-buck. The larger of these two is the black antelope (*C. niger* = *C. pluto*), from the Guinea coast, which is sooty black, with a rufous tinge on the face. The philantomba (*C. maxwelli*), from Sierra Leone, is a smaller form, with the face coloured like the back, and the fur of the legs and body of a uniform greyish-brown colour. In the third species *C. melanorheus*, from Fernando Po, and also ranging across the continent to Zanzibar, the general coloration is the same, but the rump parti-coloured. The last of these medium-sized West African species is the crowned duiker (*C. coronatus*), which belongs to the same group as the true duiker, from which it is at once distinguished by its bright yellow colour.

* *Notes Leyden Museum*, 1888, p. 1.

With the wood antelope (*C. sylvicator*) of Sierra Leone and other parts of Western Africa, we come to a well-marked species, easily recognised by its coloration and large size, which exceeds that of any of the species yet mentioned, the skull measuring somewhat more than 10in. in length. This fine species is of a blackish colour, with a conspicuous yellowish-white line running down the middle of the hinder part of the back. As its name implies, this antelope is found solely in thickly wooded districts. Lastly, the closely allied Jentink's antelope (*C. jentinki*), from the same regions, differs by its slightly smaller size, and by the general grey colour, with the head and neck black.

III.—THE STEINBOK, RHEBOK, WATER-BUCK, AND ALLIES.

The third group of African antelopes includes species of both small and large size, which agree with a few of the members of the second group in that the females are unprovided with horns, but are distinguished from all by the nearly circular opening of the tear-bag and the much narrower upper grinding-teeth, which never have an additional column on the inner side between the two chief

columns. Moreover, at least in all the larger species, the front surface of the skull has a pair of deep pits between the eyes ; and in all of them the unossified spaces in the skull above the opening of the nostrils are of comparatively large size. The so-called spurious hoofs, which are large in the preceding group, are here very small or absent. There may or may not be a tuft on the head of the smaller forms ; and while in the latter the horns are in the form of small simple spikes, in the larger species they become lyrate, and of considerable size.

The first representative of this group is Salt's antelope (*Neotragus** *saltianus*)—the Beni Israel or Om-dig-dig of the Arabs of the Red Sea littoral—which is extremely abundant in these regions and the warmer parts of Abyssinia, occasionally ranging up to considerable elevations in the mountains, and inhabiting jungles in pairs or as single individuals. It ranges as far eastward as the Somali coast. This species is one of the smallest of the antelopes, only slightly exceeding the undermentioned royal antelope in size. It is the type of the genus *Neotragus*, and is readily characterised by the small and simple

* Mr. Sclater uses the term *Modoqua* in the sense in which *Neotragus* is employed here ; while he substitutes the latter for *Nanotragus* as here used.

horns of the male, which slope backwards in the same line as the face, and are placed far behind the eyes, the tuft of hair on the crown of the head, and the hairy muzzle. The skull is remarkable for the enormous opening of the nose-cavity, and the consequent shortness of the nasal bones, in which respect it resembles the saiga. There is also the further peculiarity that the last grinding-tooth in the lower jaw is composed of only two lobes, instead of the usual three. The female of this species stands only 16in. in height. Two other equally small forms of this genus have been described by Dr. Günther,* in both of which the last lower grinding-tooth has a minute third lobe. These were named Kirk's antelope (*N. kirki*), from central Somaliland, and Kilima-njaro, in the east, and the Damara antelope (*N. damarensis*) from Damara in the south-west; but recent researches appear to show that the second is not really distinct from the first. According to Mr. Lort Phillips, Kirk's antelope, which has a more puffy nose than Salt's antelope, is exceedingly abundant in parts of Somaliland, two or three being often killed by him by a single shot. Its flesh has a disagreeable musky taste. The horns of this species are cylindrical, and thereby readily

* *Ann. Mag. Nat. Hist.*, Sec. 5, Vol. XIV., p. 425.

distinguished from those of Salt's antelope, which are flattened on the inner side, and thus present a triangular cross-section.

We now come to a closely allied genus of small antelopes, which includes the royal antelope, the steinbok, grysbok, &c., and is technically known as *Nanotragus*. It is true, indeed, that these antelopes were arranged by Dr. Gray in a considerable number of genera, such as *Nesotragus*, *Pediotragus*, *Calotragus*, *Scopophorus*, and *Oreotragus*, but the observations of Sir Victor Brooke show that most of the animals so named are too nearly allied to admit of being thus separated. All these animals differ from Salt's antelope and its congeners by the absence of the tuft on the crown of the head, the naked muzzle, and the normal-sized nose-opening and nasal bones of the skull. Sporting writers appear to have some difficulty in distinguishing between steinboks and duikers, but if it be remembered that the former never have a tuft on the head, and their tear-bag does not open in the form of a narrow slit, the difficulty at once vanishes.

The typical species of *Nanotragus* is the royal antelope (*N. pygmæus*), of Guinea, the smallest known ruminant. This elegant little creature, which rejoices in a whole list of names, fully detailed in

a paper by Sir Victor Brooke* (where a beautiful figure is given), is of a bright chestnut colour, darker on the back, and with the throat and belly white. There are no traces of spurious hoofs on the feet; neither are there any tufts of hair at the knees; and the aperture of the tear-bag is exceedingly minute. As in the other species of the genus, the hair is very harsh and coarse. The Zanzibar steinbok (*N. moschatus*) is a larger species, from the east coast, having the same structure of the feet and legs as the royal antelope, but of a reddish-grey colour, with a white belly. It would seem probable that the steinbok found further inland, to which Dr. Gray gave the name *N. livingstonianus*, is only a lighter-coloured and softer-haired variety of this species. An antelope from Masailand, described in 1885 by Herr Pagenstecher as *N. kückenpaneri*, is only a young individual of this species. A third species, having the same characters of the limbs and feet, is the true steinbok (*N. campestris* = *N. tragulus*) of South and East Africa, ranging as far north as Nyassaland. It is of nearly the same height as the red buck, standing 23 in. at the shoulder, and is usually of a reddish-brown colour, white below. The horns are

* *Proc. Zool. Soc.* 1872, p. 637.

comparatively long and slender, reaching a length of about 4in. There are two well-marked varieties as regards colour, the one deep rufous and the other silvery fawn. The tail is of moderate length, and of the same colour as the back. According to Mr. Drummond, steinboks are locally abundant, but the care with which they hide themselves causes them to show but poor sport. This species is mentioned in Livingstone's travels as *Tragulus rupestris*.

The next four species of *Nanotragus* differ from the last three in having spurious hoofs on the feet, and also small tufts or brushes of hair on the knees. Of these the oribi (*N. scoparia* = *Scopophorus ourebi*, Gray) is a large species, about 24in. in height, of a tawny yellow colour, white below, and with horns 5in. long. The oribi is one of the fleetest and most delicately built of all the smaller South African antelopes, and since its flesh is excellent eating, it is much sought after by sportsmen. Its colour harmonises so closely with the ground on which it dwells, that, according to Mr. Drummond, it will allow itself to be approached very closely, believing all the time that it is concealed. The Abyssinian steinbok (*N. montanus*) is smaller than the last, standing 22½in. in height, and of a sandy fawn colour, with a very short tail of the same colour as the back. The horns are short and

conical. As in the other three nearly related species, there is a peculiar bare spot immediately at the base of each ear. Mr. Blanford states that this antelope was rare in the parts of Abyssinia traversed by him, and that he found it among bushes or high grass at an elevation of 7000ft. The black-tailed steinbok (*N. nigricaudatus*) is a rather smaller species from the River Gambia on the Western coast, figured by Sir Victor Brooke.* It stands only 2oin. at the shoulder, and is of a grizzly-fawn colour, with a reddish forehead and a moderately long black tail. The horns are also slightly longer than in the Abyssinian species. The last of these four species is the Mozambique steinbok (*N. hastatus*), which was not recognised as a distinct form in Gray's catalogue. It appears to be closely allied to the Abyssinian species.

The two remaining species of the genus are characterised by the presence of spurious hoofs, but the absence of tufts on the knees. Of these the grysbok (*N. melanotis* = *Calotragus melanotis*, Gray) is a South African species, agreeing in size with the steinbok, and of a chocolate-red colour. Finally, we have the klipspringer (*N. oreotragus* = *Oreotragus saltator*), which ranges from the Cape

* *Proc. Zool. Soc.*, 1872, p. 874.

through Eastern Africa as far north as Abyssinia. It stands about 22in. in height, and is of a uniform olive colour, with horns about 4in. in length, and curving slightly forwards. This antelope differs from all its allies in the shape of its skull, and also by its peculiarly thick and brittle hairs, which are marvellously like those of the Indian musk-deer. The hoofs, moreover, differ from those of the foregoing species in their clumsy form. On account of these points of difference, Mr. Thomas is of opinion that it is well to retain the genus *Oreotragus* for the klipspringer. It is a mountain loving species, of somewhat thick and clumsy build, but of extremely active habits. Klipspringers were formerly very common at the Cape, but, according to Mr. Drummond, have become rare, the only part of Natal in which he found them being the Drachensberg range. Mr. Crawshay, however, speaks of them as being abundant in suitable districts of Nyassaland, and the same remark applies to Mr. Blanford's experiences in Abyssinia, where these animals ascend to heights of 8000ft. or 9000ft. From the difficult nature of the ground they inhabit, klipspringer shooting does not appear to be a favourite with African sportsmen.

The rhebok or vaal rhebok (*Pelea capreola*), an antelope inhabiting mountainous and broken districts in South Africa, is the sole representative of the genus

Pelea. It stands about 30 in. in height, and is of uniform light greyish-brown colour, becoming paler beneath. The characters by which it is distinguished from the genus *Nanotragus*, are that the very slender and comparatively small horns are placed immediately above the eyes, and are nearly upright in direction ; that is to say, they form nearly a right angle with the plane of the face. Moreover, there is no tear-bag, and the skull is consequently without the "lachrymal pit," for the reception of the same. The tail is short, broad, and bushy, and the hair is of a somewhat woolly nature ; while there is a large naked muzzle. The horns are nearly straight, with a slight forward inclination at the tips, and are placed very close together. This antelope has been called the African chamois, and, with the exception of the klipspringer, its habits are more like those of the chamois than are those of any other African antelopes. Mr. Drummond says "they are never found but on the bare hills among rocks and stones, and their habits of springing are wonderful. It seems extraordinary how their delicate limbs escape injury, when they take bound after bound, like an indiarubber ball, in places that a cat would shudder at. I do not suppose that they are really more shy than some of the other antelopes ; but the nature of the ground which they inhabit

makes it appear so. That it is hard to get at them no one will deny, and it is equally difficult to drive them, unless, indeed, you happen to know the particular troop, have often seen it, and been accustomed to notice the direction they usually take when disturbed. In such a case you may have a shot at them within ten yards, for they always follow their leader, and he, having once determined to go through some special pass or hollow, will do so whatever may happen; and would, there is little doubt, go over you rather than turn back." Rhebok horns average about 8in. in length.

The remaining members of the group may be collectively known as the water-antelopes, and are large species, always found in the neighbourhood of water. They may be arranged under two genera, viz., *Cobus* (in which may be included *Adenota* and *Onotragus* of Dr. Gray's catalogue) and *Cervicapra*, or *Eleotragus*. In these antelopes the colour is uniform; the horns of the males (Fig. 43) are somewhat lyrate, of large size, ringed throughout the greater part of their length, and curving forwards, and somewhat inwards at the tips; the tail is long, reaching as far down as the hocks; and the tear-bag is exceedingly small and rudimentary. The skull may be recognised by the deep hollow in the middle of the forehead, the absence of any

lachrymal pit for the tear-bag, and the large unossified space below the eye. One of the best known species is the water-buck (*Cobus ellipsiprymnus*) (Fig. 43), which appears to be the most abundant of the larger antelopes in South and East Africa. This fine antelope stands about 4ft. 2in. or 4ft. 3in. at the shoulder, and is of a greyish-brown colour with an elliptical white ring on the rump, from which its Latin name is taken; the hair being very long and coarse. It frequents thickets and reedy places in the neighbourhood of water, and is



FIG. 43.—HEAD OF WATER-BUCK.

generally found in pairs or small groups. A good account of shooting water-buck will be found in Mr. Drummond's book; the flesh is said to be so strong and coarse as to be almost uneatable. The pale coloured horns of this animal form fine trophies; their length being upwards of from 28in. to 31in., or even 33½in. Quite recently the water-buck has bred in the Zoological Society's Gardens. The sing-sing (*C. defassus*) is a closely allied species from Western and Central Africa, distinguished from the water-buck by the presence of a pale patch on the rump, which does not rise above the level of the tail, the absence of a white gorget on the throat, and by the much finer hair, which is very soft. The less known sunnu (*C. leucotis*), from Uganda, appears to be a closely allied species of a blackish colour, with the belly, ears, and the region round the eyes white. Whether *Cobus maria*, described from a male and female head obtained from the same region as the last species, is anything more than a variety of the latter, is a matter requiring further observation.

With the æquitun (*C. cob*) we come to a West African species from Gambia, in which the tail is shorter than any of the preceding kinds, the general colour being pale reddish-brown, with the end of the nose, inside of the ears, the belly, inner side of the

legs, the tip of the tail, and a band on the fetlocks white. This antelope also occurs in Uganda, and thus ranges almost across the continent. A curious feature of this species is the reversal of the direction of the hair on the hinder part of the head and the middle of the back. In size it is considerably inferior to the next species. The South and Central African lechi (*C. leche*) has a long and slender tail, tufted at the end; the body colour is pale brown, whitish beneath, and round the eyes; while the ears are of the same colour as the body. The lechi, which was discovered by Dr. Livingstone and his party, is found in very large herds on the Zambesi, frequently haunting the almost impassable papyrus swamps. Writing of this species, Dr. Livingstone observes, that "it is never found a mile from water. Islets in marshes and rivers are its favourite haunts, and it is quite unknown except in the central humid districts of Africa. As it stands gazing with head erect at the approaching stranger, it presents a noble appearance. When about to decamp, it lowers its head and lays its horns down to a level with the withers. It begins at starting with a waddling trot, which ends in its galloping and springing over bushes like the palas. It invariably runs to the water, and crosses it by a succession of bounds, each of which appears to be from the

bottom. We thought the flesh good at first, but soon got tired of it." The horns are about 24 in. along the curve, and do not bend forwards so much



FIG. 44.—HEAD OF LECHI ANTELOPE. (From Bryden's "Gun and Camera in Southern Africa."*)

as those of the *æquitun*. A female of this species, together with two of the *sing-sing*, are the only

* The Author is indebted to Mr. E. Stanford for the loan of this figure.

examples of this genus that had been exhibited in the Zoological Society's menagerie up to 1883. The puku (*C. vardonii*) is a closely allied species, often found with the last, from which it is distinguished by its smaller size (its height at the shoulder being about 3ft. 3in.), more erect carriage, plumper neck, and also by the horns being less turned backwards, and thus approaching those of the reitbok. The colour is foxy red, with the tips of the ears black; and the horns measure about 16in. in length. This antelope, which is figured by Mr. Selous,* inhabits dry ground close to water in the Chobe and Zambesi valleys, and generally goes in herds of from four to twelve in number.

With the reitbok, reed-buck, or Isabelline antelope, we come to the genus *Cervicapra* (= *Eleotragus*, or *Heleotragus*), which comprises three species of smaller antelopes than those of the preceding genus. In all of them the tail is bushy and relatively short, not nearly reaching as low as the hocks; the horns are comparatively small, and much curved forward at their tips, and the spurious hoofs are much smaller than in *Cobus*. The reitbok (*C. arundineum*, or *isabellina*) is a South and East African species, extending at least as far northwards as the

* *Proc. Zool. Soc.* 1881, p. 748.

Zambesi. It is of a grizzly ochre colour, and stands nearly 3ft. high at the withers, the horns measuring 12in. to 16in. in length. Mr. Drummond describes the colour as grey, and states that very old females become nearly white. The same writer observes, "Reed-buck shooting is, I consider, the most pleasant of any, without considering the fact that a fat doe of that species is probably the best eating of all the smaller antelopes." Reitbok are locally very abundant, and since they prefer more open (although swampy) grounds than the water-buck, are more difficult to stalk. An albino reitbok is recorded by "Maqaqambu" in *Land and Water*. The smaller South African species, commonly known as the roi rhebok (*C. lalandi*), averages only 28in. in height, and has longer, coarser, and redder hair than the reitbok, with a large amount of white on the under parts. Closely allied to, if not identical with this species, is the West African nagor (*C. redunca*), standing some 2½ft. high, and with horns not exceeding 6in. in length. The colour is fulvous brown above and white below, none of the hairs being grizzled. The tail is less bushy than in the reitbok, and is about 10in. long. It was originally described from Senegambia, but has been subsequently recorded by M. du Bocage from Angola, so that it has a wide geographical distribution. The

bohor antelope (*C. bohor*) is the East and North-Eastern representative of the preceding species, from which it is distinguished by its larger size and brighter colour, as well as by certain differences in the skull, recently described by Dr. Günther. The range extends from Abyssinia to Masailand and Kilima-njaro.

IV. PALAS AND GAZELLES.

The fourth group of antelopes is represented in Africa by the palas and gazelles. All the species are of moderate size. Their horns are either lyrate or recurved, and may be present in both sexes. The skull has large pits in the forehead, and also a pit below the eye on each side, as shown in the figure on page 178; and the upper grinding-teeth are tall and narrow, like those of sheep. The tail is of moderate length; and the muzzle hairy.

The pala, impala, or roibok (*Æpyceros melampus*) is the best known representative of the four African genera of this group, and is found throughout the southern and south-eastern portions of the continent. The horns, which are about 20 in. in length, are found only in the male, are widely divergent, lyrate, and somewhat spiral (Fig. 45). There is no tear-bag on the face; and the feet have

no spurious hoofs. This handsome antelope is rather more than 3ft. in height, and of a dark red colour on the back, gradually shading into dun on



FIG. 45.—HEAD OF PALA.

the flanks, and thus to white on the belly. The pala is abundant in sandy country covered with mimosa,

always near water, and frequently in the neighbourhood of hills, and may be found in herds of from twenty to thirty, or more. Mr. Crawshay speaks of its exceeding fleetness and wonderful powers of leaping, surpassing in the latter respect all the other large antelopes. A smaller variety has been recently described by Mr. Thomas, differing from the ordinary form by its proportionately smaller horns, and more slender skull. This lesser pala inhabits Nyassaland, occupying an "island" within the very heart of the distributional area of the typical pala. On the west coast, in Angola and Hasholand, the genus is represented by the closely allied Angola pala (*A. petersi*), distinguished by the presence of a black stripe running down the middle of the face, from the line of the lower border of the eyes to the upper part of the nose, and also by a black patch immediately below each eye. A figure of the head of this species is given by Mr. Sclater.*

The gazelles, most of which are included in the single genus *Gazella*, may be distinguished from the palas by the general possession of horns in both sexes, and the presence of a small tear-bag, and also of spurious hoofs. The tail is shorter than in the palas. The body colour is sandy, the rump and

* *Proc. Zool. Soc.* 1890, p. 460.

under-parts being white. In all the African species the face has a more or less distinct white streak running from below the outer side of the base of the horn to some distance above the nostril. Gazelles are mainly desert-loving forms, found not only in Africa, but also in Arabia, Persia, India, Tibet, &c. (see preceding chapter). Most of them do not exceed 30in. in height; and, as a rule, their lyrate or re-curved horns are not much more than a foot in length, although they reach 26in. in Grant's gazelle. In all the African species belonging to the genus *Gazella* horns are present in both sexes, and in the typical group these are lyre-shaped. The first species of this group is the dorcas gazelle (*G. dorcas*), of the plains of Egypt, Algeria, Syria, Palestine, and Asia Minor near Tarsus. This graceful and well-known little creature stands barely 24in. at the shoulder; and its horns are somewhat long and slender, with their tips turned inwards and forwards. The Isabelline gazelle (*G. isabellina*), of Kordofan and Senaar, is a slightly smaller but closely allied species, with shorter and softer hair, and differences in the coloration of the face and flanks. The tail, in place of being entirely black, is generally rufous above; the ears are longer, and the horns shorter and thicker, with their tips bent suddenly forwards and inwards. The korin (*G. rufifrons*), from Senegal,

is a species of fully 24in. in height, distinguished by the uniformly sandy yellow colour of the central streak on the face, and the absence of any tufts of hair on the knees. The dark band on the flanks is fuller and more defined than in the preceding species, and is thus like that of the dorcas. Sundevall's gazelle (*G. lævipes*), of Senaar, seems to be so closely allied to the korin, that there may be a question whether it is more than a well-marked local race. It appears, however, to be a somewhat larger and brighter coloured animal, and in some instances has tufts of hair on the knees. The black-tailed gazelle (*G. tilonura*) of Bogosland, is easily distinguished from the preceding species by its larger size, the height being upwards of 29in. The tips of the horns are also much turned in. A figure of the gazelle identified by Sir V. Brooke with this species is given under the synonym of *G. melanura*.* It is, however, not certain whether this or an undescribed gazelle in the British Museum is the true *G. tilonura*. Whereas in the dorcas the horns may attain a length of 13in., in this species they do not exceed 10 $\frac{3}{4}$ in., and are generally considerably less.

With Cuvier's gazelle (*G. cuvieri*), of Morocco

* *Proc. Zool. Soc.* 1873, p. 723.

and Algeria, we come to the first representative of a group of gazelles in which the horns instead of being lyrate are more or less straight or recurved. Sir V. Brooke gives the height of this species as $27\frac{1}{2}$ in., and states "that it is easily known from all the other small gazelles by its larger size, rough coat, dark colour, and unusually long ears." It seems that Mr. Buxton's* mountain-gazelle of Algeria, which is identified by Mr. Sclater with the *G. kevella* of Pallas, belongs to this species. The small-horned gazelle (*G. leptoceros*) is a little known species from the deserts of the Sudan, and is apparently about the size of the dorcas, but the horns are longer and weaker, running parallel for about half their length, with the tips inclining at first outwards and then slightly inwards. The small Speke's gazelle (*G. spekei*), from the plateau of Somaliland, with which the flabby-nosed gazelle (*G. naso*) of Mr. Sclater turns out to be identical, is distinguished from all the other members of the genus by having the extremity of the snout above the nasal openings developed into a large flabby wrinkled mass, and scantily covered by short hairs of a grey colour. Above this elevated mass the face is crossed by a broad black bar, and above

* See *Proc. Zool. Soc.* 1890, p. 361, and "Short Stalks."

that again the centre of the forehead and space between the horns is covered with dense fur of a chestnut red colour. A good figure of the head of this extraordinary looking animal will be found in the plate accompanying Mr. Sclater's paper.*

The dama gazelle (*G. dama*) is the first representative of another group, distinguished from all the preceding species by the circumstance that the white area of the rump projects forward in the shape of a wedge into the fawn colour of either side of the haunches. This very large species inhabits the Sudan in the neighbourhood of Korti—a name so well known to all during the Sudan Expedition—and thence extends southwards into Kordofan. The horns are lyrate and strongly annulated, and there is no dark band on the flanks. It was described by Dr. Gray as *G. ruficollis*. The swift gazelle (*G. mohr*) is a western species, from Senegal, which is the largest of the genus, reaching a height of 32 in., with horns of about a foot in length. It may be distinguished from the preceding species by the deeper shade and wider distribution of the red of the upper part of the body, and by the more massive and differently curved horns, which are short and lyrate. The East African Sæmmerring's gazelle

* *Proc. Zool. Soc.* 1886, p 176.

(*G. sæmmerringi*) which ranges from the Sudan to Somaliland and Abyssinia, stands about 30in. in height, and may be distinguished from the dama by the much more strongly defined markings on the face, the longer ears, of which the outer sides are bordered with black, and the more massive horns (Fig 46), which vary in length from 12in. to 19½in. This species is a plain-dwelling one, and goes in large flocks. The next representative of this group is Grant's gazelle (*G. granti*), found further to the south on the east coast, in the district of Ugogo, lying inland of Zanzibar, as well as in the Kilima-njaro district. This handsome gazelle, of which figures are given by Sir V. Brooke *, differs from all the three preceding species by the form and much greater size of the horns, which attain a length of 24in. or 26in. In the mottling of the neck and back with a pattern like watered silk, Grant's gazelle differs from all the other species, and it is decidedly entitled to rank as the finest representative of the genus. Thomson's gazelle (*G. thomsoni*), from Masailand, is a smaller species, with the horns (Fig. 47) relatively thinner and shorter, less divergent, and with a smaller degree of curvature; and is also distinguished by the presence of

* *Proc. Zool. Soc.* 1878, p. 723.

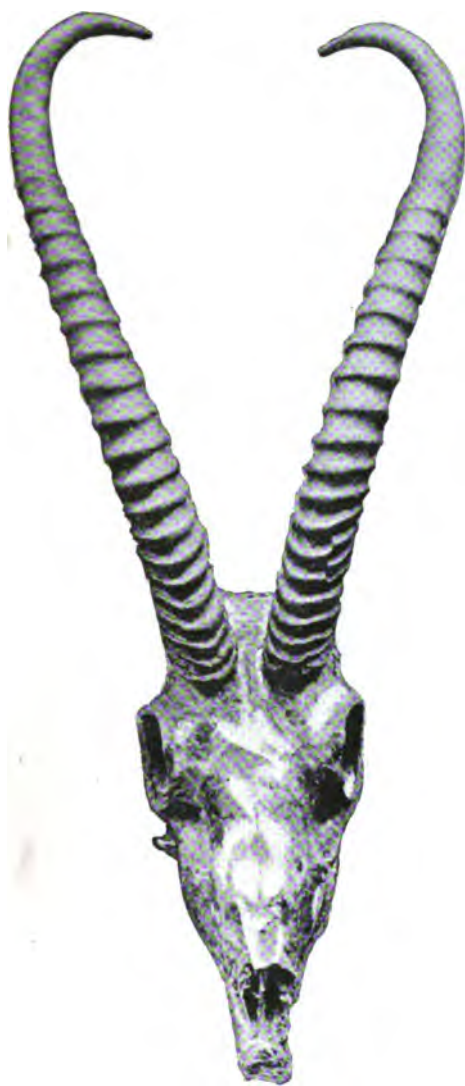


FIG. 46.—SKULL AND HORNS OF SEMMERRING'S GAZELLE.

a distinct black band on the flanks, separating the white of the belly from the fawn-colour of the flanks. The Berbera gazelle (*G. pelzelni*) from the lowlands of the Somali coast, is nearly allied to the last, from which it may be distinguished by the somewhat short and more curved horns. It lacks the black patch on the nose which is so characteristic of Speke's gazelle of the Somali plateau. Here we have to notice a little known gazelle from the Gallas country, which Dr. Günther* calls *G. petersi*, but which has not been figured. Its horns differ from those of Thomson's gazelle by the ringed portion being almost straight, and the rings themselves further apart and fewer. It is perhaps only a small variety of Grant's gazelle.

The well-known South African springbok (*G. euchore*), is an outlying species of the genus, differing from all those yet mentioned in having a white stripe, formed of long, erectile, stiff hairs running down the middle of the back. It is also peculiar in possessing five (in place of the usual six) grinding teeth in the lower jaw. Its height is about 3oin. According to M. du Bocage, it extends northwards on the western side of the continent as far as Angola. Although enormous herds of springbok

* *Ann. Mag. Nat. Hist.*, ser. 5, vol. xiv., p. 525.

which formerly occurred in the Cape, as well as their migrations, are well-known facts, it may not be out of place to quote the following extract from Livingstone: "Before we reached the Orange river we saw the last portion of a migration of springbucks, or tsepe. They come from the great

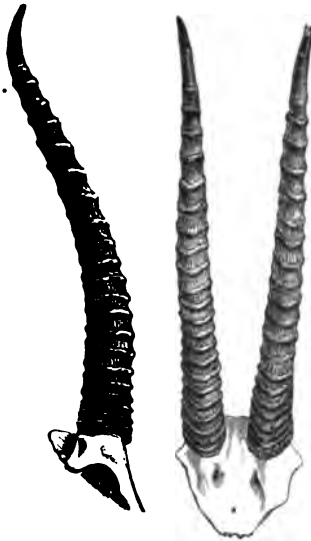


FIG. 47.—HORNS OF THOMSON'S GAZELLE.

Kalahari desert, and when first they cross the colonial boundary are said to exceed 40,000 in number. I cannot venture on an estimate, for they spread over a vast expanse of country, and make a quivering motion as they graze, and toss their graceful horns. They live chiefly on grass, and as

they come from the north about the time when grass most abounds, it cannot be want of food that prompts the movement. Nor is it want of water, for this antelope is one of the most abstemious in that respect. The cause of the migration would seem to be their preference for places where they can watch the approach of a foe. When oxen are taken into a country of high grass, their sense of danger is increased by the power of concealment which the cover affords, and they will often start off in terror at the ill-defined outlines of each other. The springbuck possesses this feeling in an intense degree, and, being eminently gregarious, gets uneasy as the grass of the Kalahari grows long. The vegetation being scantier in the more arid south, the herds turn in that direction."

The beautiful gazelle described by Mr. Thomas* as *Ammodorcas clarkei* is a species from North Somaliland, differing from all the others by the peculiar forward curvatures of the horns (as shown in Fig. 48), which are only ringed for a short distance above their bases. The females are hornless, and the characters of the skull are almost exactly intermediate between those of the true gazelles and the under-mentioned gerenuk. Their

* *Proc. Zool. Soc.* 1891, p. 207.

discoverer, Mr. Clarke, states that these gazelles "have a very long thin tail, and, when they run, throw it up and over towards the neck. The neck is very long and thrown back towards the tail, so that they look as if they would touch each other."



FIG. 48.—SKULL OF CLARKE'S ANTELOPE.

The last of the African gazelles is Waller's gazelle (*Lithocranius walleri*), which differs so remarkably from all the other species, that, like the last, it must

constitute a genus by itself. It is an East African species, first brought to notice by Sir V. Brooke* (who by an error in the heading of his paper, stated that it came from Western Africa), and subsequently figured and described more fully by Mr. Sclater;† its range extending from Somaliland to a point inwards of Zanzibar. The back of this species is peculiar in having a brown band, about 6in. in width, running along its whole length. There are no horns in the female, but those of the male are lyrate, with the tips curving forward in a peculiar hook-like manner, and about 14in. long. The most remarkable features are, however, to be found in the skull, in which the portion behind the eyes is unusually long, while the lower jaw is exceedingly slender, and the upper grinding teeth are much shorter and wider than in any of the other species. The neck is extremely elongated, which gives the creature somewhat the appearance of a llama. A correspondent of the *Field* for August 22, 1891, states that this gazelle is known to the Somalis as the gerenuk, and that it inhabits jungly districts in parties of two or three, where it feeds on mimosa bushes. It is very shy; but may be recognised even at a great distance by the length of its neck. The flesh is ill-flavoured and bitter.

* *Proc. Zool. Soc.* 1878, p. 929.

† *Ibid.* 1884, p. 538.

V. ROAN AND SABLE ANTELOPE, GEMSBOK,
AND ADDAX.

The antelopes constituting this group are all of large size, and have deep shoulders, very long and tufted tails, horns present in both sexes, and no tear-bag. The skull lacks pits on the forehead and face, and has only a very small vacant slit between the bones; while the upper grinding-teeth differ from those of all other antelopes by being extremely tall and broad, with an extra column on the inner side, and are thus almost exactly like those of the oxen. A further resemblance to that group is shown by the relatively large horns of the females, which may even exceed in length those of the males. The species may be arranged under three genera.

In the first genus *Hippotragus* (= *Ægoceros*, Gray) the roan or equine antelope (*H. equinus*) is a very handsome animal, standing from 4½ft. to 5ft. at the withers, with massive horns, more than 2ft. in length, sweeping backwards in a bold, regular curve, and strongly ringed. The neck has a short upright mane, and the general colour is a bluish-grey, although subject to great individual variation. This species is found in South, East, and West Africa, where it was formerly not uncommon. It is specially

characterised by the white streaks in front of the eyes being separated by a dark band from the white of the muzzle; while the ears are of very large size.



FIG. 49.—HEAD OF SABLE ANTELOPE.

Perhaps the pale reddish-brown form from the Gambia, described by Dr. Gray as *Ægoceros koba*, should be referred to this species; and possibly the same

remark may apply to a head from the Congo district, assigned by M. du Bocage to the sable antelope. Allied to this species is the so-called blaubok (*H. leucophæus*), which must not be confounded with the duiker of the same name—a smaller antelope formerly inhabiting the Cape, but now exterminated. The head (as shown by a specimen preserved in the museum at Paris) was uniformly coloured. The sable antelope (*H. niger*), from South and East Africa, is rather smaller than the roan antelope, from which it is distinguished by its smaller ears, and by the white streaks in front of the eyes continuing to the muzzle, and being separated on each side by a dark stripe from the white of the throat (Fig. 49). The height never exceeds $4\frac{1}{2}$ ft.; and, as the name implies, the general colour is a deep black. The horns are longer than those of the roan antelope, frequently reaching a length of 43 in. or 44 in., while they may measure as much as 46 in. Their degree of curvature is subject to great individual variation; but they are generally more compressed than those of the roan antelope. Cows have been shot with horns measuring 33 in. and 34 in., and, in one instance, 36 in. Mr. Crawshay records this species from Nyassaland, where its favourite haunts are elevated forest-clad regions; but its distribution seems to be very local.

Lastly, Baker's antelope (*H. bakeri*), from the Sudan, which attains a height of 4ft. 8in., is distinguished by its pale fulvous liver colour, the pencilled ears, and the black stripes across the



FIG. 50.—THE GEMSBOK.

shoulders; the horns also appear to be more massive than those of the equine antelope.

The well-known gemsbok (*O. gazella*, Fig. 50), is the first representative of the genus *Oryx*, dis-

tinguished from *Hippotragus* by the more slender and less curved horns, which are continued backwards in the line of the face, instead of forming a considerable angle with the same. All the oryx are inhabitants of deserts. The gemsbok is a South African species, also ranging on the West Coast to Senegambia and the Niger, and is characterised by its straight horns, reaching 3ft. and upwards in length, and the tuft of black hair on the throat, as well as by the black "points" on the limbs, flanks, and face, with which the pale colour of the body is relieved. Mr. Selous states that the longest horns he has seen reached $3\frac{1}{2}$ ft. in a bull, and 3ft. 10 $\frac{1}{2}$ in. in a cow. The height is about 4ft. That the spear-like horns of the gemsbok are sufficiently formidable to repel the attack of the lion seems to be undisputed. In Livingstone's travels the gemsbok is described as *Oryx capensis*. The beisa antelope (*O. beisa*), ranging from Suakin through Abyssinia to Berbera, in Somaliland, differs from the gemsbok by the absence of the tuft on the throat, and also by the black markings being confined to the head, throat, fore limbs, and flanks. Moreover, the dark patch on the front of the face is unconnected with the streak running through the eye, as in Fig. 51. It goes in small herds, and a good account of its habits will

be found in Mr. Blanford's book on Abyssinia. Nearly allied to the beisa is the pencil-eared oryx

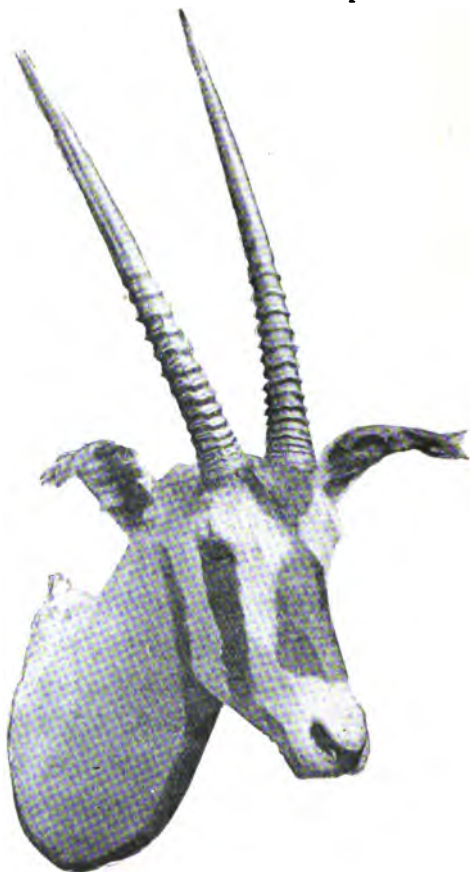


FIG. 51.—HEAD OF PENCIL-EARED ORYX. (From a stuffed specimen.)

(*O. callotis*) from East Africa (Fig. 51), in which the ears are tipped with tufts of hairs, and the

ground-colour of the hair is tawny instead of whitish. The curvature of the horns and the absence of the black points on the body and limbs at once serve to distinguish the much smaller white oryx (*O. leucoryx*) of Kordofan and other parts of North-Eastern Africa from the three preceding species. Since the Beatrix antelope (*O. beatrix*), of Western Arabia and Bushire, was purposely omitted from the list of Asiatic species, it may be briefly mentioned here. Agreeing with the gemsbok in its straight horns, in size it is not superior to the leucoryx. It is of a whitish colour, with a dark spot on the face, a large dark patch on each cheek meeting beneath the throat, the front of the legs being also blackish-brown, and the tip of the tail black.

The last representative of this group found in Africa is the addax (*Addax nasomaculata*), of North Africa, in which the horns are twisted into a slight spiral, and there is a mane on the neck, and a fringe of long hair on the throat. The general colour is nearly white, turning to grey in the winter, with the front of the face, as well as the mane and neck, dark brown. The addax stands about 3ft. 7in. at the withers, and slightly higher at the rump. Like the oryx, it inhabits open sandy deserts, and goes in small herds, which subdivide into pairs of male and female.

VI.—HARNESSED ANTELOPES, KUDU, AND ELAND.

Most of the representatives of this group are large antelopes, in which the horns are generally present only in the male sex, and have a ridge running up the front edge, and are twisted into a spiral. They have a tear-bag, and the body is very generally marked by more or less distinct vertical white stripes. The upper grinding-teeth differ from those of the preceding group by having much shorter crowns, in which the inner additional column is reduced to a tiny knob. This group includes the harnessed antelopes, kudu, and eland, which are, on the whole, the finest and handsomest representatives of all their kin.

The harnessed antelopes constitute the genus *Tragelaphus* (which includes Dr. Gray's *Euryceros*). In these splendidly coloured animals the female has no horns, but in the male the horns form one or two open spiral turns, and have the front ridge indistinctly marked. The colour is generally brilliant, and when the white stripes are developed, they are distinct and placed near together. The harnessed antelopes differ greatly in their habits, those kinds which inhabit swampy districts having their hoofs enor-

mously elongated for the purpose of affording firmer support; and there are equally marked variations in the size of the different species. The typical harnessed antelopes are small and elegant animals, not larger than goats, and their horns form



FIG. 52.—MALE AND FEMALE KUDU. (From Sclater.)

but a single spiral turn. Of these, the guib (*T. scriptus*) is a West and Central African antelope from Senegal and the Gambia, of a pale bay colour, with vertical white stripes running down from a line

of the same colour on the back. The East African decula (*T. decula*) is a somewhat smaller form, apparently mainly distinguished by slight differences of coloration and the fainter stripes. The true bush-buck (*T. sylvaticus*) is about the same size as the guib, but often has no stripes; its colour is dark reddish-brown, often verging into black, and the horns vary from 9in. to 12in. in length. The average height of the animal at the shoulder is 30in. Mr. Selous and Mr. Thomas* have found that in different districts bush-bucks vary from a uniform coloration to one with distinct spots and stripes, and thus conclude that the true bush-buck and the decula are only varieties of the guib, and the single species must accordingly be known as *T. scriptus*. Bush-bucks are exceedingly abundant in parts of South and Eastern Africa, and good accounts of their habits will be found in Mr. Drummond's book, and also in a paper by Mr. Crawshay.† In Nyassaland they are found both in the hills and in the plains where thick jungle is to be met with. They afford good sport, and when brought to bay almost invariably charge. Different individuals vary very greatly in colour, and the two sexes are very unlike. With the nyala, or inyala (*T. angasi*),

* *Proc. Zool. Soc.* 1891, p. 387. † *Ibid*, 1890, p. 648.

we come to the first of four larger species, with stouter and more massive horns, in which the spiral forms more than a single turn. This species, which occurs in Zululand, Nyassaland, and other parts of South-Eastern Africa, stands 3ft. 4in. at the withers, and is of a dark bluish-grey colour, with the white stripes few in number and faintly marked, and a mane on the neck, back, and belly. The horns are rough, and of moderate size, attaining a length of about 2ft. Mr. Drummond remarks, "Perhaps the most beautiful of all the antelopes that I have seen is the nyala; the white lines with which it is striped being more numerous, more regular, and much better defined than those of either the kudu or the striped eland. . . . Unfortunately, it does not exist except in the low fever-stricken districts, and I have never seen it south of the Bombo range, about the 28th degree of south latitude. It frequents the densest thickets it can find, and is wary and difficult to stalk; indeed, I should fancy that more people have caught fever by hunting this antelope than by the pursuit of any other animal in Africa, except, perhaps, the elephant." Mr. Drummond gives an uncoloured figure of this species, while the horns are figured by Sir V. Brooke.*

* *Proc. Zool. Soc.* 1871, p. 482.

The handsome West African bongo (*T. euryceros*), from the Ashkankolu Mountains, sixty miles south of the equator to the south-east of the Gabun, is a much larger species, distinguished by its deep chestnut colour, the more numerous and strongly marked stripes, the total absence of any mane, and the smooth and massive horns, wearing to a yellowish colour at the tips. There is a white crescent on the chest, and a white spot on either side of the face below the eyes. The extreme brilliancy of the colouring of this magnificent antelope is well shown in the plate accompanying Sir V. Brooke's paper on the harnessed antelopes.* The next two species differ from all the preceding ones by the extreme elongation of their hoofs. The first of these is the West African harnessed antelope (*T. gratus*), from the Gabun and other districts of Western Africa, in which the body is striped and spotted, and the general colour of the male dark olive, there being no fringe of hair on the throat. The height is 43in. The female is rufous, with similar stripes and spots. The second species is the sitatunga, or nakong (*T. spekei*) of Central and South Central Africa, especially near Lake Ngami and the adjacent regions, which is con-

* *Proc. Zool. Soc.*, 1871, p. 482.

siderably smaller than the nyala, and is of a rusty-brown colour, without stripes, a mane on the neck, and the whole of the hair unusually long ; the horns being smooth, slender, strongly ridged, and more like those of the kudu than are those of the other species.* Dr. Livingstone observes that "the habitat of the nakong is the marsh and muddy bogs, where it is borne up by the great surface over which its weight is distributed—its foot, between the point of the toe and the supplemental hoofs, leaving a print which is fully 12in. long. Its gait closely resembles the gallop of a dog when tired. It feeds by night, and lies hid among the reeds and rushes by day. When pursued, it dashes into sedgy places, and immerses the whole body, except the point of the nose and the ends of the horns. The hunters burn large patches of reeds to drive it from its lair ; but when it sees itself surrounded by enemies in canoes, it will rather allow the projecting tips of the horns to be scorched by the flames than come forth from its hiding-place." Lastly, we have the Aruwimi antelope, discovered in the forest of that name during the Stanley expedition, and only known by the horns and skin.

The two well-defined species of kudu constitute

* *Brooke, op. cit.*, p. 482.

the genus *Strepsiceros*, which differs from the more typical kinds of harnessed antelopes by the horns being more twisted, and forming a very open cork-screw-like spiral, with their front ridge very prominent (Fig. 53). The skull has a much larger unossified space below the eye, and a deep depression on the forehead not found in most harnessed antelopes.

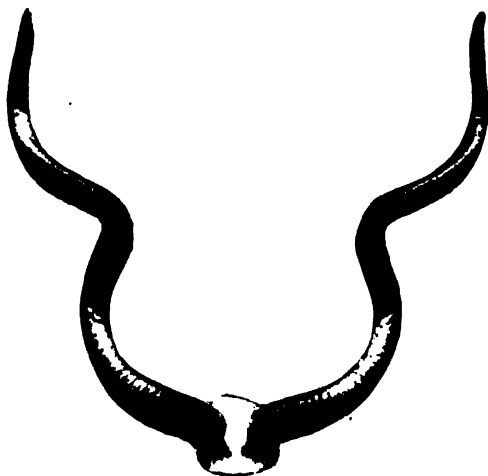


FIG. 53.—HORNS OF KUDU.

The kudu (*S. kudu*) inhabits Southern and Central Africa, extending on the east as far north as Abyssinia, and on the west to Angola. It is so well known as to require very brief mention, but it may be well to observe that it is inferior in size to the eland, and that the magnificent horns may attain a

length of 43in., while one instance is known where they reached $45\frac{1}{2}$ in. in a straight line. The general colour is slaty-grey, with vertical white stripes like those of the harnessed antelopes, and the throat is



FIG. 54.—HEAD OF HORNED FEMALE KUDU.

ornamented with a fringe of long hair. The kudu is not remarkable for its speed, but is wonderfully expert in getting across difficult country ; it affords good sport with hounds, and a graphic account of

the hunting of two bulls will be found in Mr. Drummond's oft-quoted book. The lesser kudu (*S. imberbis* or *tendal*) is a considerably smaller species from Somaliland and Kilima-njaro, in which the horns are more slender and form a less open spiral, and the throat is devoid of a fringe. A young individual of this species, and also the adult horns, are figured by Mr. Sclater.* Quite recently Dr. Matschie† has applied the name *S. suara* to a kudu from German East Africa, but further evidence is required before its right to distinction can be admitted. Fig. 54 shows a female kudu killed by Mr. Selous with horns, which are abnormally formed.

The last, and at the same time the largest, of the African antelopes are the elands, which differ from the kudus by having horns in both sexes, and also by the horns themselves being twisted on their own axis, instead of forming an open spiral. The true eland (*Orias canna*, Fig. 55) inhabits Southern and Central Africa. It would be superfluous to give any description of this magnificent and well-known animal, only mentioning that a variety discovered by Livingstone in Central Africa differs from the

* *Proc. Zool. Soc.* 1884, p. 45.

† *Sitzber. Ges. Nat. Freunde, Berlin*, 1892, p. 137.

common form in being marked with white stripes like a kudu, and also in having a black patch of more than a hand's breadth on the outer side of the leg. Eland generally inhabit undulating and well-wooded districts, with intervening open plains,



FIG. 55. —HORNS OF ELAND.

where the grass does not grow too long and rank. They are timid in disposition, although easily stalked ; and were formerly found in enormous herds in many parts of South and East Africa. Mr. Drummond,

writing in 1875, says, however, that the demand for their hides "has so diminished their numbers as to have restricted this noble animal to a few favoured localities, even in which it is becoming more scarce every day, while not many years ago it formed a component part of almost every landscape in the southern and eastern portions of Africa." Mr. Crawshay states, on the other hand, that large herds of eland are still to be met with in portions of Nyassaland, although in other parts they have become very rare. As civilisation spreads, it is to be feared that herds of eland will soon become a thing of the past in all the accessible parts of Africa. On the west coast, the still larger Derbian eland (*O. derbianus*) is an imperfectly known species, with much finer horns, and a dark brown mane on the necks of the bulls, found in Angola and Senegambia. M. Rochebrune proposes to call the Senegambian eland *O. collini*; but it is probably not really a distinct species.

It may be mentioned here that certain horns from the Zambesi which were at one time regarded as indicating a distinct genus and species of antelopes (*Doratoceros triangularis*), are almost certainly abnormal specimens of those of a cow eland.

As the final result of our review of the African antelopes, it appears that the total number of species

at present known, if we set down the duiker-boks at twenty, will be somewhere about ninety-five, or fourteen more than those recognised by Dr. Gray in 1872. This is, however, exclusive of those recently described by Dr. Matschie. Whether this large list will be increased by the discovery of new species from the little known central regions, or whether it will have to be slightly reduced by referring some of the species to the rank of varieties, time alone will show.

CHAPTER VI.

THE DEER OF ASIA.

TO the circumstance that the red deer and the roe are the only true indigenous wild animals now inhabiting the British Isles which can properly be included among "large game," may be in some degree attributed the high estimation in which the members of the deer tribe generally have always been held as objects of veneration. Quite apart, however, from this adventitious aid, deer would undoubtedly have always claimed a prominent place in the estimation of both the sportsman and the naturalist on account of the graceful form and magnificent proportions assumed by the branching antlers of many of the larger species. The term "antler," we may observe, is derived from the old French *antoiller*, which is itself a derivative from the late Latin *antoculorum* (before the eyes), and was originally applied to that branch of a deer's horn which we now term the brow-tine. Subsequently, it appears to have been applied to all the processes, or

snags, of the horns, while at a still later date it has been very generally taken to denote the entire horn. And since a deer's horn is totally different in structure from that of a goat or antelope, we shall find such a use of the term antler very convenient, as tending to do away with any confusion which might otherwise arise.

Although in our own islands we have two indigenous kinds of deer, while a third—the fallow deer—has been introduced, and Northern Europe can claim two other species, namely, the elk and the reindeer, yet the true home of the deer family at the present day is undoubtedly Asia. In that vast continent we have not only representatives of the seven groups into which the true deer—the genus *Cervus* of zoologists—are divided; but we also find that five of such groups are exclusively Asiatic, some of these five being confined to India and the adjacent regions, while others are characteristic of China, Japan, &c. Moreover, there are several groups of deer found in various regions of Asia, but unknown elsewhere, differing so materially from the true deer (*Cervus*) that by general consent they are regarded as representing distinct genera. Such are the muntjacs (*Cervulus*), extending from India to China, Michie's deer (*Elaphodus*) of China, the Chinese water-deer (*Hydropotes*), and the still more

remarkable musk-deer (*Moschus*), ranging from the Himalaya to Siberia. Then, again, there are three species of deer—namely, the roe, the elk, and the reindeer—severally representing as many genera, which, although inhabitants of Europe, also enter the confines of Asia. Remembering, then, that



FIG. 56.—THE RIGHT ANTLER OF A RED DEER FOUND IN AN IRISH BOG.
(After Owen.)

there are several kinds of muntjacs, and that some of the Asiatic groups of true deer include several species, we shall at once perceive that the representatives of the deer family in Asia are extremely numerous. Indeed, the only cervine group which is

not represented on that continent is that of the American deer (exclusive of the wapiti, elk, and reindeer), which differ markedly from all the Old World kinds, and are referred to two distinct genera, *Carriacus* and *Pudua*; the latter being represented only by a single small species from the Chilian Andes.*

The list of Asiatic deer being so large, it is but natural to expect that in many instances, more especially where we have to deal with those of the numerous islands of the Malayan region, there would be a certain amount of difficulty in the determination of the exact number of species which really exist. Till comparatively recently, many of the deer of these islands have been generally regarded as distinct from those inhabiting the mainland of India; but in his important work on the "Mammals of British India" Mr. W. T. Blanford has shown that the number of species may be considerably reduced. As such local races are frequently referred to by sportsmen (who in this respect can but follow the lead of the scientific zoologist) as distinct species, a general survey of the whole of the species of Asiatic deer now recognised by the best authorities cannot fail to be of interest to the sportsman. There is,

* See next chapter.

moreover, an additional need for a readily accessible summary, since in his work on "Wild Beasts and Their Ways," Sir Samuel Baker has somewhat complicated matters by suggesting that certain perfectly well-defined species are inseparable from others; and the sportsman who does not pretend

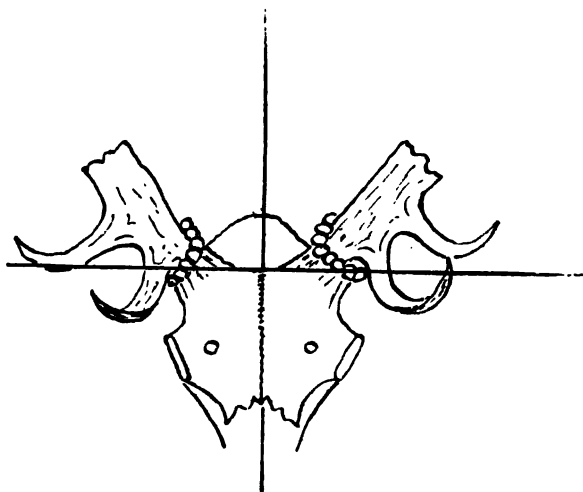


FIG. 57. UPPER PART OF SKULL OF RED DEER. (After A. G. Cameron.)

to scientific knowledge is thus naturally puzzled by the conflicting opinions.

Before proceeding to our survey of the various species, it may be worth while to mention that fossil deer, more or less closely allied to some of the living Oriental species, are found in the upper Tertiary rocks of Europe, while remains of species still more

nearly related to many of those now inhabiting Peninsular India occur in the Siwalik Hills at the foot of the Himalaya. In both cases such remains are accompanied by others belonging to antelopes very like many of those now living in Africa, and since, with the exception of the so-called Barbary deer (a variety of the red deer) of Algiers, there is not a single deer to be found throughout the length and breadth of the African continent, this mingling of deer and antelope remains in Europe and India is a most remarkable circumstance. It is, indeed, perfectly easy to understand how the descendants of the fossil antelopes of Europe and India migrated into Africa, where they subsequently flourished to a marvellous degree before their haunts were invaded by European hunters. But why, at the same time, the ancient deer of those continents did not make good their entry into Africa, is one of those curious features in zoological distribution which are at present exceedingly difficult to understand.

Passing on to our serial survey of the various species of Asiatic deer, we have first to notice that the true deer, or those comprised in the genus *Cervus*, are characterised by the large dimensions attained by the antlers of the bucks, which are usually at least two or three times the length of the head, and, as a general rule, are simply branched ;

although in a few cases (as in the fallow deer and the extinct Irish deer) they are much flattened out, or palmated. These antlers rise at an acute angle with the central line of the forehead, and do not branch in the regularly forked manner characteristic of American deer, while they nearly always have a brow-tine at their base. Then, again, none of the true deer ever have large tusks in their upper jaws, while the front aspect of their skulls is not marked by the divergent prominent ridges which form such a characteristic feature in those of the muntjacs. Another distinctive characteristic of the true deer is the moderate size of the naked portion of the narrow muzzle. And in most cases their young are spotted. There are, indeed, certain other characteristics which are not so obvious, and require a certain amount of anatomical knowledge to be fully understood, and these we accordingly put aside on this occasion.

By several writers the true deer have been split up into a number of distinct genera, and if we had only to deal with species as different from one another as is the English red deer from the Indian sambar such divisions might well be adopted. It happens, however, as is so generally the case when a group of animals contains a large number of species, that the extremes of the series are connected

by more or less completely intermediate types. And it has accordingly been the practice of late amongst zoologists, at least in this country, to include the whole of the true deer in the genus *Cervus*, and to subdivide that genus into a number of minor groups, the members of which we now proceed to consider *seriatim*, commencing with

I.—THE RED DEER GROUP.

The group to which our own red deer gives its name is the one which includes the typical representatives of the true deer, and also the largest species found in the whole genus. The primary and most easily recognised characteristic of the group is to be found in the antlers. These (as shown in Fig. 56 and Fig. 58) are generally furnished with three tines on the front of the beam (as the main shaft of the antler is termed). The first of these tines is the brow-tine (Fig. 58, *A*), the second the bez—or bay-tine (*b*), and the third the trez, tray, or royal, tine. The summit of the beam may be either simply divided into two or three tines, as in Fig. 58, or may be split up into an almost indefinite number of points, radiating from a central cup, as in Fig. 56). These terminal snags, whether they be

two, or whether they be many, are designated the surroyals, or crown of the antler.

We have been thus particular in noting the proper designations of the tines of the antlers of the red deer, for the reason that we have in some cases observed a certain amount of confusion in this respect. For

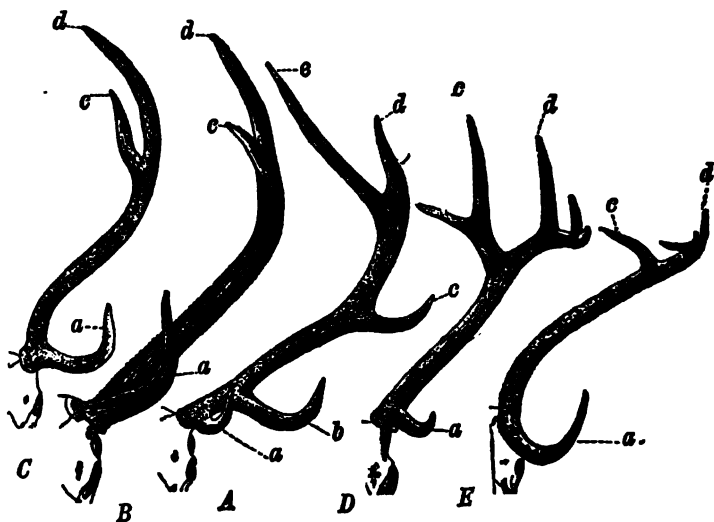


FIG. 58.—LEFT ANTLEERS OF ASIATIC DEER.

A Hungal, or Kashmir deer. B Sambar. C Spotted deer. E Eld's deer.

a Brow. b Bez. c Trez-tine. d, e Anterior and posterior surroyals.

(After Blanford and Forsyth.)

instance, Mr. Sterndale, in his "Natural History of the Mammalia of India," applies the term "royal" to the branch *d* in Fig. 58; whereas, as we have seen, the royal tine is properly the same as the trez-tine.

Another distinctive feature of the antlers of the red deer group, and one by which they can be recognised when (as is usually the case in the Barbary deer) the bez-tine is absent, is to be found in the great length of the portion above the trez-tine (*c*) carrying the surroyals. This will be apparent by comparing together the five antlers represented in Fig. 58. Finally, all the members of the red deer group are characterised by having a whitish patch on the rump.

The red deer group may be regarded as essentially a northern one, since it is quite unknown to the southward of the Himalaya, and is wanting in the whole of the Malayan region. The largest number of species are found in the tract extending eastward from Persia.

The red deer (*Cervus elaphus*) itself, which was formerly widely distributed over Europe, extends into Western Asia, being found in many parts of Asia Minor as well as in Transcaucasia. It does not, however, enter into Persia, or, at most, is only found on the extreme western confines of that kingdom, being replaced to the eastward by the maral, of which more anon.

In Bell's "British Quadrupeds" the red deer is also stated to be found in Northern Asia, throughout a considerable portion of Siberia from the Ural

to the Lena. In the year 1867 Professor A. Milne-Edwards, of the Paris Museum, gave, however, the name *Cervus xanthopygus* to a deer from Northern Asia, distinguished from the ordinary red deer by the larger size of the light patch on the rump, and likewise by certain peculiarities in the skull. Subsequently to that date the deer of the red deer type found in the whole of Northern Asia, from the Caucasus, through Siberia to Amurland, and thence to Northern China, has been generally referred to as *C. xanthopygus*. The late Sir Victor Brooke remarks, however, that "it is by no means certain that *Cervus xanthopygus* (should the species ultimately prove distinct from *Cervus elaphus*, which I greatly doubt) is the form found in all the localities mentioned above." With this doubt as to the right of the deer of Northern Asia to specific distinction, the sportsman, at least, will do well to follow the great Russian traveller and zoologist, Prejevalsky, in regarding it as only a variety of the red deer. It should, however, be remarked that some of the deer thus designated may belong to the wapiti-like species to be noticed below.

Including, then, these forms under that head, we shall have occasion to allude to some of the characteristic features of the antlers of the red deer when noticing those of some of the other members

of the present group. We may, however, mention here that the cup in the surroyals, surrounded by an almost indefinite number of snags, as in Fig. 56, is very distinctive of large and old bucks of this species. It is perhaps scarcely necessary to mention that antlers of the size and complexity of the one represented in the figure alluded to are quite unknown at the present day among the red deer of this country, and, indeed, among those of the greater part of Europe. That such magnificent antlers were, however, produced a few centuries ago by the red deer of the German forests, is proved by the specimens preserved in many Continental collections, and also by the unrivalled series in the possession of Viscount Powerscourt, at Powerscourt, co. Wicklow, which the writer had the opportunity of seeing a few years since.

As is well known, the antlers of the red deer are liable to abnormal variations, and one of the most remarkable of these is presented by a shed antler, brought by Mr. C. G. Danford from Asia Minor, and described and figured in the *Proceedings of the Zoological Society* for 1890. In that specimen, which is of enormous size, the beam, after having probably given off a brow and bez-tine, forms a straight uninterrupted shaft as far as the surroyals, without any trace of a trez-tine, the surroyals them-

selves being much flattened, and forming only one side of a cup. So different, indeed, is this antler from that of an ordinary red deer, that it is, at first sight, rather difficult to believe that it belonged to that species. Other abnormal specimens show, however, a transition from the one to the other type, so that there can be no reasonable doubt as to the nature of Mr. Danford's example.

Next to the red deer, the best-known Old World representative of this group is the Kashmir stag, or hangul (*Cervus cashmirianus*), which, in its typical form, appears to be restricted to the mountains surrounding the vale of Kashmir and a few of the adjacent valleys, such as Maru-Wardwan to the eastward, and Tilel to the northward. Although all the members of the red deer group are so nearly alike that there is much to be said in favour of the view of writers like Sir Samuel Baker, who regard the whole of them as belonging to a single species, yet there are certain more or less well-marked points of distinction between them, and it is somewhat curious that most or all of the species inhabiting Central Asia are more nearly related to the American wapiti than they are to our own red deer.

The Kashmir stag is generally somewhat larger than the Scottish red deer, fine specimens standing as much as 4ft. 4in. at the withers. The antlers

(Fig. 58, *A*) generally have but five points, although sometimes six or more, and the surroyals are never sub-divided so as to form a large cup like that so often found in the red deer. As a very general rule, the bez-tine of the hangul is longer than the brow-tine, whereas in the red deer the reverse condition usually obtains, although in our figured antler (Fig. 56) of the latter the bez-tine happens to be rather the longer of the two. As regards colour, the distinction between the Kashmir and the red deer is comparatively slight, both usually having the whitish patch surrounding the tail.

All Highland sportsmen who have been deer-stalking in Kashmir will, however, probably have been struck by the great difference between the voice of the red deer and that of the hangul in the rutting season. Sir Victor Brooke, who seems to have been the first to draw special attention to this point, observes that "in the former it is a loud squeal, ending in a more guttural tone; in the latter it is a distinct roar, resembling that of a panther. The voice of the wapiti resembles that of the *Cervus cashmirianus*." In the absence of a cup in the surroyals of its antlers, the Kashmir stag is also nearer to the wapiti than to the red deer, although in some other respects its antlers are unlike those of the former. According to Mr. Blanford, some 40in.

is an average length for the antlers of this species, but specimens of 52in., 53in., and 55in. have been recorded.

The hangul was first recognised as a distinct species by the late Dr. H. Falconer, some time superintendent of the Government Botanical Gardens at Saharunpur, during a journey to the then little known valley of Kashmir during the years 1837 and 1838. Unfortunately, however, it was not till many years subsequently that his notes were published. Many accounts of the Kashmir stag have since appeared, and among these we may especially refer to the one given by the late Professor Leith Adams in his "Wanderings of a Naturalist in India" (1867), and to that by General Macintyre in his sporting volume, "The Hindu-Koh" (1890).

The hangul does not usually commence calling till well into October, and the proper shooting season is therefore during that month and the early part of November. Owing to the circumstance that military leave in India terminates on October 15, it is but comparatively few English sportsmen who have had many opportunities of hangul shooting. From this it might have been inferred that this fine stag has enjoyed a comparative immunity from attack. Unfortunately, however, this is by no means the case, and unless stringent means are adopted for its pro-

tection, the animal runs a fair chance of extinction at no very distant date. The great slaughter of this deer takes place in the winter at the hands of the native shikaris, who murder the unfortunate creatures by scores when they are driven down by the snow into the valley of Kashmir itself. At such seasons, we have been informed by the Kashmiris, bucks and does are frequently indiscriminately butchered, one of the largest slaughters brought under our notice having taken place some thirteen years ago near the village of Bandipur, on the north side of the Walar Lake—a place which is now of some importance as being the starting point for our new frontier station, Gilgit. As another factor in the diminution in the numbers of the Kashmir stag we may allude to an order issued by the Maharaja of Kashmir some years ago, that each shikari should annually supply one or more heads to decorate the durbar-hall of one of the royal palaces. The collection thus brought together, more than ten years ago, when we last saw it, was very extensive, and if it has been increasing at the same rate ever since must now be enormous. Probably, however, with the new *régime* recently introduced into Kashmir, the order has been cancelled.

The forest districts haunted by the hangul afford some of the most beautiful scenery of its kind to be

met with anywhere ; and the pleasure of camp-life among these glorious woods is in itself well nigh sufficient to compensate for the lack of game which is too frequently the lot of the sportsman. To those who for the first time essay this sport, a word of caution in regard to the danger of walking on the dry, slippery grass, with which the sides of the hills are then clothed, may not be out of place. We believe, indeed, that more accidents have happened from slipping on dry grass than in any other kind of Himalayan sport. Above all things, the grass-shoes, which are so excellent for snow, should on no account be used in hangul stalking.

Before proceeding to discuss the next species on our list, it may be well to mention that in some works, as in General Macintyre's "Hindu-Koh," the scientific name of the hangul is given as *Cervus wallichii*. As a matter of fact, that name was applied many years ago to the figure of a deer living in the Viceregal menagerie at Barrakpoor, near Calcutta, a pair of whose shed antlers are now preserved in the museum at Calcutta. This deer, which was said to have come from Nipal—although this is scarcely likely—cannot now be definitely identified either with the hangul or with the undermentioned shou, and the name, *C. wallichii*, must, therefore, for the present at least, be discarded in favour of *C. cashmirianus*.

The stag found in the woods and thickets bordering the river courses to the eastward of Yarkand and Kashgar was at one time regarded by Mr. Blanford as being probably nearly allied to, or perhaps identical with, the maral; but specimens recently brought by Major C. S. Cumberland have enabled him to determine that it is a variety of the Kashmir stag (*C. kashmirianus*, var. *yarkundensis*).* The first evidence of the existence of this deer in the districts mentioned was obtained by the members of the British Yarkand Expedition of 1873, although no specimens of its antlers were brought back to India. A head was, however, procured by the late Mr. Shaw while residing at Kashgar, of which the antlers much resembled those of the Kashmir stag, having five tines each. At one time these deer are stated to have been regularly hunted by the Kashgarians for the sake of their antlers, which formed an article of trade with China. Of the specimens brought down by Major Cumberland, one was five-tined and another six-tined. An excellent account of deer shooting in Eastern Turkestan is given by that sportsman in *Land and Water* for 1891.

Far away to the south-east of Kashmir, probably

* *Proc. Zool. Soc.*, 1892, p. 116.

somewhere on the line connecting Darjiling with Lhasa, the hangul is replaced by a still finer and larger deer, known to the Tibetans as the shou, its scientific name being *Cervus affinis*. It was long considered that this deer was an inhabitant of the small state of Sikhim, on the borders of which is situated Darjiling, and it was hence frequently spoken of as the Sikhim stag. According, however, to Mr. Blanford, this species is quite unknown either in the Sikhim valley or in the Chumbi valley immediately to the eastward, and its true home is, therefore, probably in the valleys still further eastward, of which the drainage flows northward into the Sangpo. The name Tibetan deer would, therefore, be a better designation for this species, if we desire one in addition to the native shou.

Comparatively little is known of this fine stag, which in colour closely resembles the hangul. In addition, however, to its considerably larger size, the shou is distinguished by the marked forward bend of the beam of the antler just above the trez-tine. The antlers themselves are almost invariably five-pointed, so that the surroyals are merely forked, and the trez-tine is less constantly longer than the brow-tine than is the case with the Kashmir stag. Antlers have been measured of 54in. in length, and

the height of the animal at the withers has been given as varying from 4½ft. to 5ft.

No European sportsman, so far as we are aware, has hitherto shot this deer. Magnificent specimens of its skulls and antlers have, however, been recently presented to the British Museum by Mr. A. O. Hume, formerly Secretary to the Government of India for the Department of Agriculture, Revenue, and Commerce. A single antler, said to have been brought from Ladak (where there are no deer), and described as *Cervus narayanus*, is regarded by Mr. Blanford as probably referable to a young shou.

The Lhasa stag (*C. thoroldi*), recently obtained by Dr. W. G. Thorold at an elevation of about 13,500 feet some 200 miles to the north-east of Lhasa, and named by Mr. Blanford, appears to be a very well-marked species, differing from all the other members of the group, except the Barbary variety of the red deer, in the absence of a bez-tine to the antlers.

The maral (*Cervus maral*), which stands next on our list, is another large deer, occurring in the Caspian provinces of Persia, but, according to Mr. Sclater and Sir V. Brooke, also found in Circassia. This species, according to Sir V. Brooke, may be readily distinguished, both from the red deer and the shou, by the much greater length of the face.

The antlers appear to be of the general type of those of the shou, but they have more than two tines on the crown when fully developed. A pair of maral, kept by Sir V. Brooke with a herd of red deer, showed no desire to mingle with the latter. These deer are said to be abundant in the Caspian provinces of Persia, where they inhabit thick forests. In Persian the word maral means deer of any kind.

The last of the Asiatic representatives of the present group of deer is the Thian Shan stag (*Cervus eustephanus*), inhabiting the forests of the great mountain barrier on the north-west frontier of Eastern Turkestan, and represented in Amurland by a closely-allied or identical species. The Thian Shan stag, which is known to the Mahomedans of Central Asia by the Persian name of maral, was first described by Mr. Blanford from two shed antlers purchased in Kashgar by the Yarkand expedition; but another and larger pair were also obtained at the same time, and presented to the then Viceroy, Lord Northbrook. The great peculiarity and interest attaching to these antlers is that they are much more like those of the American wapiti than those of any of the other Asiatic deer. As was pointed out many years ago by the late Mr. E. Blyth, the antlers of the wapiti differ from those of the hangul, shou, and maral by their general smoothness, by the tendency to a

flattening and expansion of the surroyals, by the greater number of snags at the tips, and by the well-marked backward curvature and absence of convergence in the upper part of the beam. In his original description of the shed antlers, Mr. Blanford remarked that they appeared to be intermediate between those of the wapiti and those of the other Asiatic deer of the present group, although decidedly nearer to the former than to the latter. Subsequently Sir V. Brooke, who had an opportunity of inspecting the fine pair presented to Lord Northbrook, observed that in their great size and flattened crowns the antlers of this deer so closely resembled those of the wapiti "that it would be impossible to decide to which species they belonged." In his latest work Mr. Blanford concludes that the great stag of the Thian Shan must be regarded either as a local race of the wapiti, or a very closely allied species.

The original shed antlers have a length round the curve of 51 in., with a basal diameter just above the burr of 10·5 in., in the one, and of 10·1 in. in the other example, while both carry seven well-formed tines; but we have no information as to the dimensions or number of points on the antlers in the possession of Lord Northbrook. No skin of the stag has, we believe, been brought to this country, but specimens described by the Russian travellers,

Severtzoff and Prejevalsky, from the forests of the Thian Shan and neighbouring ranges measured upwards of six feet at the shoulder.

Much further to the east, in Amurland, we have also a very large wapiti-like deer, known scientifically as *Cervus luedorfi*. It is, however, most probable that this deer is not specifically distinct from the Thian Shan stag, and it is likewise not improbable that some of the deer found in the intermediate area and referred to *Cervus xanthopygus*, will also prove to belong to the same species.

Whether we regard them merely as local races, or as one or more distinct species, the occurrence in the heart of Central Asia of deer so nearly related to the American wapiti is a very interesting fact. And it is, moreover, one which very strongly tends to support the opinion that the migration of the mammals common to the Old and New World has taken place by way of Behring Strait and Alaska.

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II.—THE JAPANESE DEER AND ITS ALLIES.

The second group of true deer is represented by several species of medium size, mostly from Eastern Asia, of which the Japanese deer (*Cervus sica*) is one of the best known. All these deer differ from

the typical red deer group in the absence of a bez-tine, each antler usually having but four points, viz., a brow and a trez-tine, and the end of the beam dividing into a fork, of which the anterior tine is much the longer. They are further characterised by the coat of the adult, being spotted with white in summer, but uniformly brown in winter, and also by the pure white patch on the rump being banded with black on the sides. The tail is longer than in the red deer group.

The Japanese deer is generally somewhat smaller than a fallow deer, with the ground-colour of the fur yellowish or dark brown, and the greater part of the tail white. These deer have been successfully acclimatised by Lord Powerscourt in county Wicklow. In the year 1860 his lordship purchased three does and a buck from Jamrach, and in 1884 the produce of these had reached a hundred, in addition to many others which had been shot or given away. The Viscount, writing from Powerscourt, observes that "the Japanese deer here have undoubtedly interbred with the red deer; there are three or four deer in the park here which are certainly hybrids, the red hind being, in each case, the dam. The Japanese are a most satisfactory little deer; the venison, when dressed, is about the size of Welsh mutton, and very well flavoured. The little stags,

with their black coats and thick necks, like miniature sambar, are very picturesque and ornamental, and I think they are a decided addition to our varieties of hardy park deer. Some of them are always to be seen in the (Zoological) Society's gardens, but these give no idea of the beauty of the animals when in a wild state in a park. They also have a most peculiar cry in the rutting season—a sort of whistle, varying sometimes into a scream.”

A deer from Newchang, North China, first described by Mr. Swinhoe as *Cervus euopsis*, is now regarded as inseparable from the Japanese species, whose range is thus extended to the mainland. Sir Samuel Baker, writing of a Japanese deer, which he compares to a fallow deer with rounded, four-tined antlers, and which is evidently the present species, mentions that it is found in very mountainous districts, where it clings closely to the covert afforded by the woods clothing the ravines and scarps. “The only method of shooting in such a country,” observes Sir Samuel, “is by driving, either by beaters or by disturbing the forest with dogs, and posting guns in well-known passes, which the deer will probably run through.” Several head were bagged in the course of such beats by the native hunters. In the northern island of Japan, as we are informed by the same writer, these deer are still

more numerous, but the country is so "blind" that shooting can only take place with the aid of an army of beaters.

Closely allied to the preceding series is the Mantchurian deer (*Cervus mantchuricus*), from Northern China, mainly distinguished by its superior size, and, according to Dr. Gray, by the greater degree to which the dark colour of the body extends on to the upper surface of the tail. There is, however, a smaller variety of this species which so closely approaches the Japanese deer as to lead Sir V. Brooke to consider "it probable that when a larger series of this group of deer are brought together it will be found impossible to separate them into definite species, but that it will be found necessary to regard them as one species of wide geographical range, endowed with a constitution sufficiently elastic to enable it to support very variable conditions."

Dybowski's deer (*Cervus dybowskii*), from the upper Ussuri district of Mantchuria, not far from Vladivostock, is another allied stag, now generally regarded as a distinct species. A head and antlers, regarded as belonging to this species, were purchased comparatively recently in the bazaar at Darjiling, but these are now known to pertain to the Lhasa deer. It is, perhaps, the largest member of the

group, and in its winter dress is nearly of the colour of the roe, while in summer the hindquarters are faintly spotted. The type specimen has four times to each antler, which measure 22in. in length. The white muzzle is very characteristic of this deer.

The Formosan deer (*Cervus taiwanus*), from the mountains of the island of Formosa, is one of the smaller members of this group, characterised by its paler body-colour, and the tendency of the spots to remain during the winter, as well as by its somewhat longer fur. The tail is white, with a black line down the middle of the upper surface. Dr. Gray observes that, although this deer, when contrasted with those from other districts, can be readily recognised, yet that to describe its distinctive characteristics in words is almost impossible. As, however, the Japanese, Mantchurian, and Formosan deer are well represented in the gardens of the Zoological Society those interested in the subject can readily judge for themselves as to the value of these points of difference; and it is not improbable that a stag described under the name of *Cervus pseudaxis* is identical with this species. Dr. Guille-mard, in the "Cruise of the Yacht Marchesa," who alludes to the species under the latter designation, states that Formosan deer are imported from their native home by the inhabitants of the small island

of Samasana, lying off Formosa, and are kept as pets. Most of those seen by him had lost one or other of their fore feet, from having been caught in traps.

The last representative of this group which can be regarded as entitled to rank as a distinct species is the Caspian deer (*Cervus caspicus*), from the Talish mountains, near the south-west corner of the Caspian Sea, in Northern Persia. This species is still imperfectly known, but, if rightly referred to the present group, is of some interest as showing that these deer are met with on both sides of Asia. The one known skull differs from that of all other species of the group in having but three tines, viz., a brow-tine and a terminal fork.

III.—THE SPOTTED DEER.

The spotted, or axis deer (*Cervus axis*), of India and Ceylon, is regarded by Sir Victor Brooke as the sole representative of a distinct group, although it is undoubtedly nearly related to the hog deer. The antlers of the spotted deer (Fig. 58 C) which are about three times the length of the skull, differ from any of those we have yet noticed, in having, as a rule, but three points, the bez-tine, as in all the

remaining groups, being absent. At the base is a large brow-tine, usually given off from the beam at rather less than a right angle, while near the extremity the beam is simply forked ; the anterior, or inner branch of the fork—apparently representing the trez-tine—being much smaller than the posterior branch. In such an antler we have, therefore, nothing comparable to the surroyals of the red deer.

The spotted deer is so well known that it needs but little description. We may observe, however, that the spots persist both in the summer and winter dress, and also occur in the young. Mr. Blanford gives the height of bucks from Central and Northern India at from 36in. to 38in. at the shoulder ; but in Southern India the size is usually much less. Antlers have been measured of between 38in. and 39in. in length along the curve, and with a basal circumference of 5·75in. just above the burr. About 30in. may, however, be taken as the average size of good antlers. There is a rare black variety of the spotted deer, in which the spots are scarcely perceptible. Scarcely any animal forms such a constant feature in an Indian jungle scene as the spotted deer. They are found both in open and in hilly districts, but never far from the neighbourhood of water, and generally near the bushes or bamboo

thickets, and they always go in herds, which may number several hundred individuals. According to Mr. Blanford, the species is unknown in Sind and the Punjab to the north-west, and in Assam in the north-east, but is spread over the greater part of the rest of India. In the Himalaya it only frequents the very outermost spurs of the range.

We have yet to mention that the native name of *Chital*, or *Chitra*, by which this deer is very widely known in India, has the same meaning as our term spotted deer. The word is again met with in *Cheeta*, or *Chita*, as applied to the common and hunting leopard; while the spotted soft-tortoises of the Indian rivers are also designated *Chitra*. Those desirous of consulting good accounts of the habits of the spotted deer, and of its pursuits, may refer to Captain J. Forsyth's "Highlands of Central India," Sir S. Baker's "Rifle and Hound in Ceylon," and "Wild Beasts and Their Ways," as well as to many other works on Indian sport.

Before leaving this species it may be observed that antlers of the same general type as those of the spotted deer are found in the Upper Tertiary deposits of France and other parts of Europe, thus indicating that the axis belongs to a comparatively ancient type of deer. This, indeed, might have been predicated from the relatively simple form of its

antlers, although this induction would also hold good for the sambar. We have, however, other evidence to show that the axis belongs to a more primitive stock than the latter. This is indicated by the retention of the spots in the adult, most other deer being spotted only in the young condition, while the sambar has even lost the spots in the young. Why it is that spots and stripes should have tended to disappear in the adults of so many animals is not very clear, but that it is so is perfectly certain, as witness many deer and all swine, American tapirs, and lions, in which, while the young are more or less distinctly striped or spotted, the adults are uniformly coloured.

IV.—THE SAMBAR GROUP.

The deer of this exclusively Oriental group may be at once distinguished from the spotted deer by the brow-tine of the antlers being given off at an acute angle with the beam, the number of tines, as in the latter, being normally three. Moreover, the colour is generally uniform brown in the adult, although two species are more or less distinctly spotted, and, as it is these small spotted and maneless species which connect the typical members of the group with the spotted deer in a strict serial

arrangement, it is these which ought to be considered first. On the whole, however, we find it more convenient to commence with the largest and most striking member of the group. The name sambar, it may be observed, is the Hindustani term for the species we are about to consider, while to the Malays it is known as rusa, which also appears to be a name for deer in general. The sambar (*Cervus unicolor*) is by far the largest and finest of all the deer of Peninsular India, and its massive and rugged antlers, in spite of their few branches, will always, from this very massiveness, attract attention in any series of sporting trophies. The characteristic form of their antlers is shown in Fig. 58, B, and also in the head represented in Fig. 59. The male sambar, or elk, as it is so frequently quite incorrectly termed by Indian sportsmen, is indeed a grand animal, standing from 4ft. to 4ft. 8in., or even more, at the withers. The coat of this deer is peculiarly rough and coarse, and is generally of a uniform dark brown tint throughout, even from birth. In the general absence of any trace of spots in the young, the sambar stands quite alone among Indian deer*; and it will be gathered from the remarks recorded

* A correspondent of the *Asian* states that the sambar of North-Eastern India have spotted young; a statement which, if confirmed, indicates a distinct variety of the species.

under the heading of the spotted deer, that the species must in this respect be regarded as what zoologists term a specialised one—that is, one departing considerably from the original primitive deer, which we must assume to have been spotted at all ages. Another characteristic feature of the sambar is the shaggy mane, which can be erected at will, clothing the neck and throat.

Although but rarely having more than the normal three tines, the antlers of the sambar are subject to great variation in the relative lengths of the two terminal tines, and there is also an enormous difference in the bulk of the antlers themselves. The largest antlers that have ever come under the writer's notice, so far as a cursory examination admits of determining, were nailed up over a doorway at a small railway-station near Bombay. Mr. Blanford, who has paid especial attention to this point, regards any antlers measuring more than 35in. in length as good specimens, and states that such are seldom, if ever, found beyond the limits of India. According to the same writer, the "record" length of sambar antlers is 48in. These, however, had only a girth of 6in. in the middle of the beam, whereas others with a length of only 41in. had a girth of 8½in. in the middle, and nearly the same circumference has been recorded in antlers of

between 35in. and 40in. in length. We can compare the rugged beams of large sambar antlers to nothing more appropriately than to the younger branches of some of the rough-barked varieties of the elm.

The sambar has a very wide geographical range, but, owing to the variation of the antlers in different districts, or even among different individuals inhabiting a single district, somewhat diverse views have obtained as to how extensive this range really is. And in consequence of these variations the species has received quite a bewildering array of scientific names. In the first place, we shall find in practically all modern works the sambar mentioned under the name of *Cervus* (or *Rusa*) *aristotelis*. Mr. Blanford has, however, shown that this name was applied by the French naturalist Cuvier to a single abnormally-shaped antler, and is antedated by the term *Cervus unicolor*, which, as he remarks, is exceedingly appropriate to the only Indian deer with uniformly-coloured young. This, then, is undoubtedly the proper scientific name for the sambar.

As a rule, in the antlers of the Indian form, the two upper tines are of nearly equal length, and this characteristic was regarded by Sir Victor Brooke as absolutely distinctive of the species, although he

gave its range as embracing Burma and Siam. In Burmese heads, however, as we are told by Mr. Blanford, the antlers are smaller, and have their

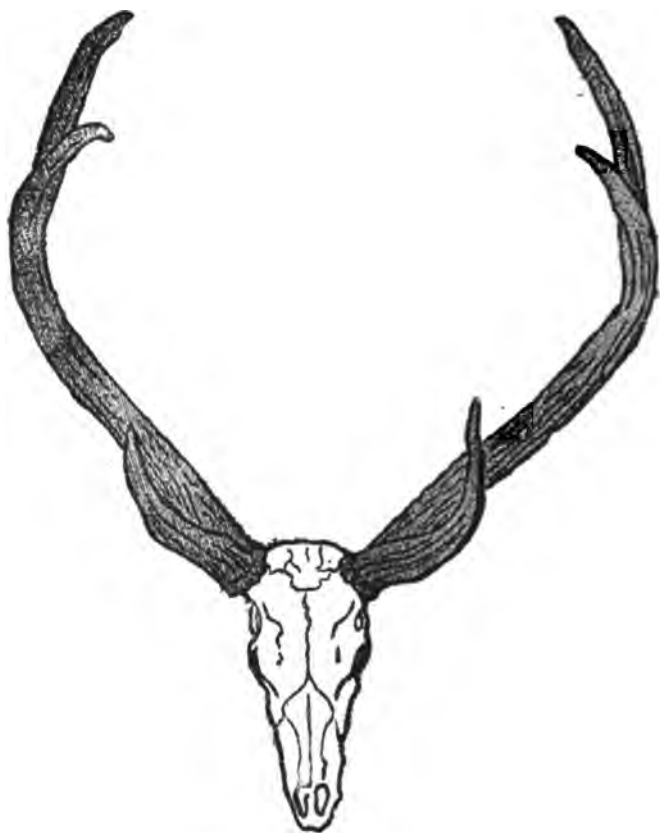


FIG. 59.—SKULL OF SAMBAR. (After Forsyth.)

inner or posterior tine (Fig. 58, B, *d*) considerably shorter than the outer or anterior tine (*ibid.*, *c*), this

variety being the same as the so-called equine deer (*Cervus equinus*), of the Malay Peninsula, Borneo, and Sumatra, which Sir V. Brooke had suggested might eventually prove to be inseparable from the true sambar. In another type, to which the name *Cervus hippelaphus* has been applied, the inner or posterior tine (*d*) is considerably longer than the outer tine (*c*), but Mr. Blanford, with whom we entirely agree, follows the late Mr. Blyth in regarding this type also as being in all probability nothing more than a variety or local race of the sambar. Probably also Swinhoe's deer (*C. swinhoei*), from the island of Formosa, is likewise not specifically distinct from the same widely-spread species.

We thus have evidence indicating that the sambar apparently ranges over almost the whole of what is termed by zoologists the Oriental Region, although, as we shall see later on, some of the smaller Malayan islands may be tenanted by allied species.

In habits, the sambar is essentially a forest loving animal, and it differs from the spotted deer in being generally found in small family parties of from five to a dozen or so in number, or solitary. It prefers hilly to low-lying tracts, and, according to Mr. Blanford, ascends in the Himalaya to elevations of 10,000ft.; while graphic accounts of its haunts on the highlands of Ceylon are furnished by Sir

Samuel Baker. A curious fact connected with the sambar, vouched for both by the last-mentioned writer and the late Captain James Forsyth, is that, at least in many cases, the antlers are not shed annually. Moreover, although the shedding time appears to be generally in the spring, yet there is great irregularity in this respect, and harts with fully developed horns may be met with at all seasons of the year. Sir S. Baker, writing of his experiences in Ceylon, states that, "I never saw a sambar absolutely without horns, although during seven years I was continually hunting them with a pack of hounds. . . . One hundred and thirty-eight sambar were killed with the hounds and the hunting-knife. It may be safely asserted that we killed an average of sixty every year, which would yield the large amount of four hundred and twenty during seven years. Allowing only four hundred as my personal experience of sambar in Ceylon, where the hounds made no distinction of sex, but ran the first scent they came across, it is very extraordinary that we never found a stag which had so recently shed its horns that only the base remained. They were constantly met with when in velvet, sometimes only a few inches in length, but never completely barren to prove that the antlers were only just discarded."

Few accounts of sporting adventures are more interesting and exciting than Sir S. Baker's description of sambar hunting with hounds in Ceylon, which will be found both in the "Rifle and Hound in Ceylon," and in "Wild Beasts and their Ways"; while those desirous of acquiring full information on the subject of sambar stalking may consult Forsyth's "Highlands of Central India."

In regard to the smaller members of the group, we may observe that the island of Timor, lying to the east of Java, and also the Moluccas, adjacent to Celebes, are respectively inhabited by small deer allied to that variety of the sambar in which the inner tine of the antler surpasses the outer in length. These are severally known as the Timor deer (*Cervus timoriensis*) and the Molucca deer (*C. moluccensis*). Whether, however, these deer have been originally introduced by the Malays, and have gradually dwindled in size in conformity with the smallness of the area they inhabit, or whether they are truly indigenous and distinct species, is one of those questions scarcely admitting at present of a decisive answer. The Timor deer is a short, thick-set animal, scarcely half the size of the smaller variety of the sambar, and with a remarkably concave profile to the face, such as Sir Victor Brooke states he has observed in ill-nourished specimens of

the red and fallow deer. The Molucca deer is a more slender and gracefully built animal of approximately the same dimensions.

The Philippine deer (*Cervus philippinus*), with which the Marianne deer (*C. marianus*), of the Ladrone or Marianne Islands, appears identical, is another of these small sambar-like deer, allied to the variety in which the outer tine is longer than the inner. These deer are scarcely larger than the hog-deer, but more slender in build, and of a uniform dark brown colour, with the exception of a pale ring round the eye and the under part of the tail and the inner sides of the thighs, which are white.

With Kuhl's deer (*Cervus kuhli*), from the small Bavian islands, lying between Borneo and Java, we come to a well-marked species of small size, which, while agreeing with the preceding kinds in being uniformly coloured at all ages, differs in having a skull with the structural peculiarities of that of the hog-deer, and also by the absence of tusks in the upper jaw. In size this species comes very close to the hog-deer, but it has relatively longer limbs, while the hairs of the back and flanks are ringed, instead of uniformly coloured. The colour is pale brown. This species has bred freely in the Zoological Gardens at Amsterdam, and, like the next, has been represented in the menagerie in the Regent's Park.

Prince Alfred's deer (*Cervus alfredi*) is a Philippine species, differing from all those yet noticed in being spotted at all ages, and thereby resembling the Indian spotted deer. The type specimen of this pretty stag measured 2½ ft. at the shoulders, and had horns of about 5 in. in length. The colour is a dark chocolate brown, with the sides of the body ornamented with some six rows of rather indistinct pale yellow spots, such spots being absent from the back and tail. The antlers are not greatly longer than the head, with a short brow-tine, and a very short trez-tine directed inwards. The large ears are almost naked externally. This deer takes its name from H.R.H. the Duke of Edinburgh, by whom the first specimen received in England was brought home in 1870. It was at that time considered to be most nearly related to the spotted deer.

The well-known hog-deer (*Cervus porcinus*), of India and Burma, is the last, and at the same time the smallest, member of this group, which can be certainly regarded as entitled to rank as a distinct species. In addition to its very inferior dimensions, the hog-deer differs from the sambar by the absence of a mane on the neck and throat, and also by the want of upper tusks, while the legs are relatively shorter, and the antlers smaller, and mounted on longer pedicles of bone arising from the forehead.

Then, again, the young of the para (as this species is called in Hindustani) are distinctly spotted till they are about six months old. Moreover, even in the adult state the summer dress is ornamented in most cases with two or more rows of pale brown or whitish spots, although in some individuals these are so faintly marked as to be almost invisible. In height a hog-deer scarcely exceeds 2ft., and the length of well developed antlers varies from about 10in. to 12in.

There has been some degree of uncertainty as to the distribution of the hog-deer, owing, as we are informed by Mr. Blanford, to this name being frequently applied in Madras and Bombay to the so-called mouse-deer or chevrotains, and perhaps also to the muntjac. This transposition of names appears probably due to the presence of large tusks in the two species last named, which would not unnaturally lead to a comparison with pigs; but, as Sir S. Baker remarks, it is very difficult to understand why the term "hog-deer" was applied to the present species, unless it be from its habit of lying in tall grass in regions frequented by pig. As a matter of fact, the hog-deer is not found in Peninsular India proper, but is restricted, according to Mr. Blanford's observations, to the great Indo-Gangetic plain, from Sind and the Punjab in the

west to Assam in the east. It is also found in the "Terai," or swampy lands at the foot of the Eastern Himalaya, and thence through Sylhet to Burma and the Tenasserim provinces. The few that occur in one small area in Ceylon have been introduced by human agency.

The para differs from all the species yet noticed in that it goes about in pairs, or singly, although a considerable number of individuals may not unfrequently be found within a limited area. They are frequently put up when shooting in the "khadir," or low-lying ground of the Ganges valley, and will often lie till the beaters are close upon them, when they will start off with a violent rush, sometimes crouching again after having run a hundred yards or so. As they are difficult to hit with a bullet, more especially when shooting from an elephant, Sir Samuel Baker recommends BB or buck-shot. They may also be speared from horse-back, when they will generally give a good run before they are overtaken.

V.—THE SWAMP-DEER GROUP.

The last group of the true deer found in India includes three species in which the antlers are quite different from those of either of the two preceding

groups, and are generally more complex. The brow-tine is always large, and is either given off from the beam at rather more than a right angle, or forms a continuous curve with the same. Beyond the brow-tine the beam, which is generally considerably flattened, is uninterrupted for some distance, when it divides in a fork-like manner, while each branch of the fork may again sub-divide into two or more tines, as in Fig. 58, D. All the species are large, with maned necks and short tails, and while all the adults are uniformly coloured, their young are spotted.

The swamp-deer (*Cervus duvauceli*), which is the best known representative of the group, is termed, by the natives of India, barasingha (*i.e.*, twelve-tined), but as the same name is also given to the hangul of Kashmir, its use is liable to engender confusion. Still, however, as remarked by Mr. Blanford, the name swamp-deer is by no means free from objection, seeing that this species frequents open grassy plains; while Eld's deer is truly a swamp-dwelling species. The brow-tine frequently has small knots on its upper surface, and each terminal branch of the beam of the antler again divides. In the antler figured, the inner branch has two and the outer three points; such an antler thus affording an example of a true barasingha. The

number of points may, however, be considerably in excess of this, and one head has been described

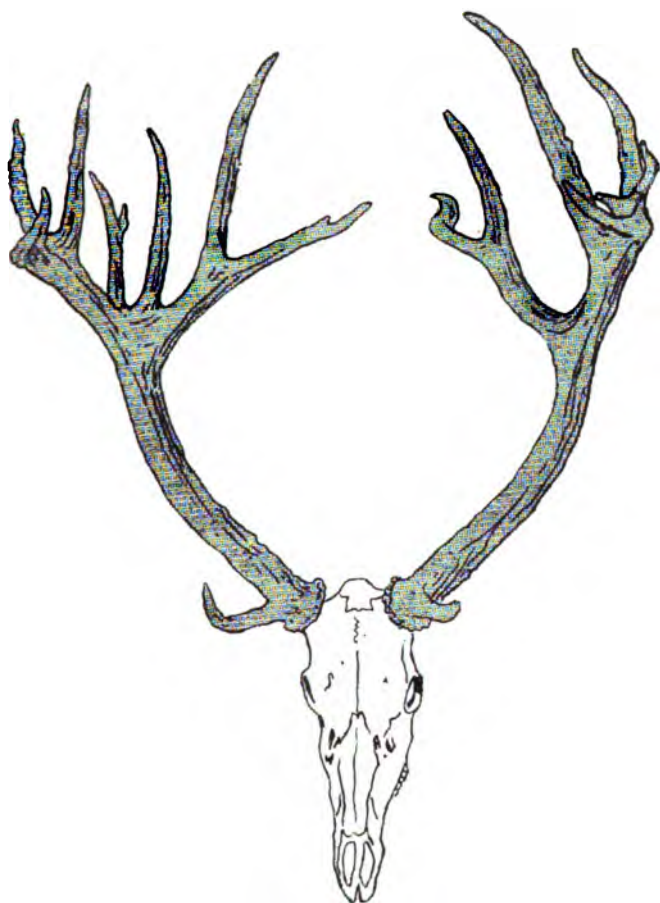


FIG. 60.—SKULL AND ANTLERS OF SWAMP-DEER. (After F. B. Simson.)

with more than twenty points. A swamp-deer

stands from 3ft. 8in. to 3ft. 10in. at the withers, and its colour in summer is yellowish, and in winter reddish brown, with the under parts lighter. The skull represented in Fig. 60 has remarkably fine antlers, with no less than sixteen points.

It might have been thought that, with antlers so different as are those of the present species (Fig. 58, D) from those of the red deer group (*ibid.*, A), there would have been no hesitation among sportsmen in recognising the wide distinction between their respective owners. Writing, however, of the swamp-deer in "Wild Beasts and Their Ways," Sir Samuel Baker says: "I should feel inclined to link this species with the true red deer, although I believe it has been decided to be distinct. I feel sure that, should an average swamp-deer be killed, or introduced among a herd of red deer in Scotland, no person would remark any peculiar difference." This is certainly one of the most surprising and misleading statements we have ever come across. Had the author but consulted that good old book, Scrope's "Days of Deer Stalking," and compared the figure of the antlers of the "stag of Scotland" with that of those of the "stag of Asia," we feel assured that the sentences in question would never have been penned.

The swamp-deer is found in more or less open

ground, not necessarily swampy, on the outskirts of forest. In autumn and winter it is found in herds, generally of about thirty to fifty, but occasionally numbering hundreds. In spring the bucks are in velvet, and are then usually solitary. The species is restricted to India, and is somewhat local and peculiar in its distribution, but is found along the foot of the Himalaya, from Assam to some distance west of the valley of the Jumna river. It also occurs in part of the Narbada Valley, and in the Central Provinces frequents only those forests inhabited by the red jungle-fowl, and in which the "sal" tree flourishes. The reason for this predilection for "sal" forests is not very clear, since, according to Mr. Blanford, the food of this deer consists almost entirely of grass.

The second representative of this group is Schomburgk's deer (*Cervus schomburgki*) of Siam. This species is distinguished from the swamp-deer by the beam of the antler being very short below the bifurcation, so that its length is not greater than that of the tines of the fork. The brow-tine is very long, and there are generally five points to each antler. We have not met with any accounts of the habits of this species, which are, however, probably very similar to those of the swamp-deer.

Very remarkable is the form of antler (Fig. 58, E)

presented by Eld's deer (*Cervus eldi*), which inhabits low-lying swampy grounds in the valley of Manipur, Burma, the Malay Peninsula, Cambodia, and the island of Hainan. This deer, which is about the same size as the swamp-deer, has the brow-tine curving down over the forehead in such a manner as to form an almost continuous sweep with the beam of the antler. The beam itself is curved at first backwards and outwards, and finally somewhat forwards, and near its termination divides into a short fork, the tines of which may again be subdivided into as many as eight or ten points. The brow-tine may also carry a number of small points on its upper surface, and there is very frequently a distinct snag at the junction of this tine with the beam. The individuals from Cambodia have the upper part of the beam much flattened. According to Mr. Blanford, it appears that the winter dress of the bucks is dark brown, tending to black; while in the summer their hue is fawn-colour, approaching that of the does at all seasons. The spots disappear from the young at a very early age. Mr. Blanford gives 40in. as the average length of antlers, measured along the curve from the top of the brow-tine to the extremity; but a pair in the National Collection measures upwards of 54in., and it is reported that even larger dimensions are attained.

These curious deer were first discovered in the year 1838, by Mr. Eld, from whom they take their name. By the Burmese they are called *Thameng*, and *Sangnai* by the Manipuris. They are usually found in herds of from fifty or more individuals, and are described by Mr. Beavan, to whom we are indebted for the best account of their habits, as exceedingly shy and wary. Although this shyness is most conspicuous in the bucks, yet when brought to bay they will fight fiercely. Contrary to the habits of the sambar and hog-deer, when disturbed these deer invariably make for the open country, instead of flying to the nearest cover. Their food is stated to be chiefly grass and wild rice.

VI.—DAVID'S DEER.

China is a country of strange things and strange customs, and we ought, therefore, not to be surprised to find that it produces three species of deer quite unlike those found in any part of the globe. Of these three species the one that now claims our attention is Père David's deer (*Cervus davidianus*), which probably inhabits Mantchuria, and is about the size of the swamp-deer. The great peculiarity of this deer is that the antlers, instead of having a

brow-tine, have one very long and nearly straight tine given off just above the burr, and directed backwards. Above this, the beam ascends for some distance, and then divides into a fork, the two prongs of which may again sub-divide. The normal number of points in each antler is therefore three, and at first sight it appears as though the animal had antlers like those of the swamp-deer turned the wrong way forwards, so that the back tine represented the brow-tine of the latter. In reality, however, it seems that the back tine represents the posterior branch of the fork of the swamp-deer's antler (Fig. 58, D, *d'*), and that the fork at the end of the beam corresponds to the anterior branch (*c*) of the latter. A further peculiarity of this species is to be found in the length and bushiness of its tail. Sir V. Brooke considers that the young are not spotted.

This deer was first observed by Père David in 1865, who saw it by looking over the wall of the imperial park at Peking. Our knowledge of the habits of the species is mainly derived from specimens which have been exhibited in the Zoological Society's Gardens.

VII.—FALLOW DEER.

The last group of the true deer is represented by the fallow deer of our parks, and by an allied species found in Persia. This group is sufficiently characterised by the antlers carrying a brow and trez-tine, and then forming a flattened and palmated expansion, with three or four more snags on its hinder border (Fig. 61). The white spots in the summer dress form another characteristic feature of the fallow deer. As the common fallow deer (*Cervus dama*) is unknown in Asia, we pass to the consideration of the second species.

The Persian fallow deer (*Cervus mesopotamicus*) inhabits the mountains of Luristan, in Persian Mesopotamia. It is closely allied to the common species, with which it will freely interbreed, but is of much larger size, and has the trez-tine of the antlers broader and placed nearer to the very small brow-tine, while the palmation of the extremity, according to a figure given by Sir Victor Brooke, is much less marked; the main expansion thus being below, instead of above the middle of the shaft.

The fallow deer completes our list of the Asiatic representatives of the genus *Cervus*, all the deer that

we have now to notice being referred to other genera. The first of these is represented by a



FIG. 61.—HEAD OF FALLOW DEER. From a specimen in Epping Forest, after a Sketch by Mr. H. A. Cole.*

single Chinese species of small size, which now claims our attention.

*This specimen belongs to a race characterised by the extreme narrowness of the expanded portion of the antlers.

VIII.—THE TUFTED DEER.

With the tufted deer (*Elaphodus*), of which there are two species, we come to the first of two groups of small deer, characterised, among other features, by the small size of the antlers, which are mounted on long bony pedicles, and do not exceed half the length of the head, and also by the presence of long tusks in the upper jaws of the bucks. The present genus is sufficiently characterised by the antlers forming very minute, unbranched spikes, and by the absence of any prominent ridges on the front of the skull. It has also a tuft of hair on the crown of the head.

These deer are of nearly the same size as the Indian muntjac, and have fur remarkable for the extreme coarseness of the hair of which it is composed; so coarse, indeed, are the hairs that they have been compared to quills. Of the two species, the Tibetan tufted deer (*E. cephalophus*) was obtained by Père David from Moupin, in Eastern Tibet, but Michie's deer from Ningpo, on the eastern coast of China, described subsequently under the name of *Lophotragus michianus*, turned out to belong to the same genus, and is now known as *E. michianus*. The two differ from one another chiefly in colour.

IX.—THE MUNTJACS.

The muntjacs, or rib-faced deer, constituting the genus *Cervulus* of zoologists, differ from the tufted deer in that the pedicles of the antlers are divergent instead of convergent, while the antlers themselves have a minute knob in front representing the brow-tine. Moreover, the bony pedicles on which the antlers are supported are continued down the face in the form of prominent divergent ridges, thus giving origin to the appropriate name of rib-faced deer.

In India there is but a single species of this genus—the common muntjac, rib-faced deer, barking deer, or kakar (*Cervulus muntjac*), as it is variously called. This little deer, with its bright chestnut-coloured coat, is so familiar to all Indian sportsmen, that we shall not spend time in its description. We may observe, however, that the average height of the bucks is from 20in. to 22in. at the shoulder, and the total length, inclusive of the tail, about 42in. The antlers are seldom more than 5in. long (exclusive of the supporting pedicles), and are generally considerably less. Mr. Blanford mentions, however, that antlers of 11in. are stated to have been measured. Wherever thickly wooded hills occur throughout India, Ceylon, and Burma, there muntjacs are almost sure to be found, their

presence being usually revealed by the loud single "bark" uttered at morning or evening. When driven from cover, they go off at a tremendous pace, especially if, as is generally the case, they travel down hill. Once, when beating a small patch of forest in Kulu, the writer put up a brace of kakar, which made their way at racing pace towards his camp at the bottom of the hill, hard by a small river. The two servants who were left in charge of the tents had but little experience of "shikar," and seeing what (as the writer afterwards learnt) they took for wolves or leopards making straight for them, were seized with sudden fright, and promptly plunged into the river, where they stood, in full apparel, up to their necks in water, until the animals had sheered off in another direction. It need hardly be added that on the return of the hunting party to camp, the timid "chuprassie" and "bearer" were greeted with peals of laughter.

The range of the kakar is by no means limited to India and Burma, but also embraces the Malay Peninsula and the islands of Borneo, Sumatra, Java, and Hainan. On the Chinese mainland its place is, however, taken by other species.

Fea's muntjac (*Cervulus feæ*), from Tenasserim, is a darker coloured species, of rather inferior size, with a short tuft of hair between the antlers, and

the tail measuring only 4in. (instead of 7in.) in length. It is also distinguished by the tail being entirely white, with the exception of a narrow black stripe down the middle of its upper surface. At present this species is only known by a single specimen, obtained in the mountains near Moulemein; and sportsmen in these districts should, therefore, be on the look out for such a *rara avis*—if we may thus designate a mammal.

Within the limits of the Chinese Empire there are three well defined species of muntjac, in addition to the common kind found in the island of Hainan. The first of these is Sclater's muntjac (*Cervulus lacrymans*), originally described from Moupin, in Eastern Tibet, and subsequently, under another name, from the hills in the neighbourhood of Hangchow, in Eastern China. This species is readily characterised by the extremely bright tint of the yellowish hair on the head and neck, which forms a marked contrast to the much darker hair clothing the body.

The second Chinese species is Reeves's muntjac (*C. reevesi*), found in Southern China, from the latitude of Canton as far north as Ningpo, and also recorded from the island of Formosa. This is the smallest of all the muntjacs, and is characterised by its very brilliant coloration. The pedicles of the

antlers are less divergent than in the other species, and the cavity in the skull for the "tear-bag" is larger. Lastly, we have the very handsome hairy-fronted muntjac (*C. crinifrons*), described in 1885, from a male specimen transmitted to England by Mr. A. Michie, from Ningpo, China, and doubtless obtained from the neighbouring regions. This deer, as its describer, Mr. Sclater, remarks, is distinguished from all the other species of the group by the long tuft of hairs clothing the forehead and top of the head, so as almost to conceal the extremely short antlers; and also by the length of the tail. The general colour is dark brown, passing into blackish on the sides of the rump and on the limbs, but the upper part of the head is chestnut, while the buttocks and under part of the tail are pure white. The contrasts of colour thus exhibited render this muntjac a decidedly striking species. In height this animal stands about 24 in., while its tail measures 9 in. in length. The bushy hair on the forehead and crown gives to this species a marked resemblance to the tufted deer, just noticed. Nothing is known of its habits, and there is accordingly an opening for residents in Eastern China to do good service to zoology in regard to this point.

X.—THE ELK.

The whole of the deer we have hitherto considered are collectively characterised by a peculiar structure in the bones of the feet, which can unfortunately be only observed in their prepared skeletons.

Since, however, this feature is one of some importance we must devote a few words to its consideration.

Probably most of our readers are aware that the so-called shin or cannon-bone of the deer and other ruminating mammals represents the two middle bones of a pig's foot, which have completely coalesced. This cannon-bone in both hind and fore feet supports the two large middle toes (Fig. 62), but the two small lateral toes, also shown in the same figure, are never provided with complete supporting bones lying parallel to the cannon-bone on either side. In all the deer hitherto mentioned these



FIG. 62.—BONES OF THE LEFT FORE FOOT OF AN AMERICAN DEER. *td*, the wrist or carpus. (After Osborn.)

lateral supporting bones, which are complete in the pig, are represented merely by small splints lying on

each side of the *upper end* of the cannon-bone,

which would occupy a position a little below *td* in Fig. 62. On the other hand, in all the deer we have now to consider, these lateral supporting bones take the form of two splints at the *lower end* of the cannon-bone, as in Fig. 62, and thus actually support the bones of the lateral toes themselves. This distinction was first pointed out by the late Sir Victor Brooke; and whereas in all the deer of the Old World, except the Chinese water-deer, the

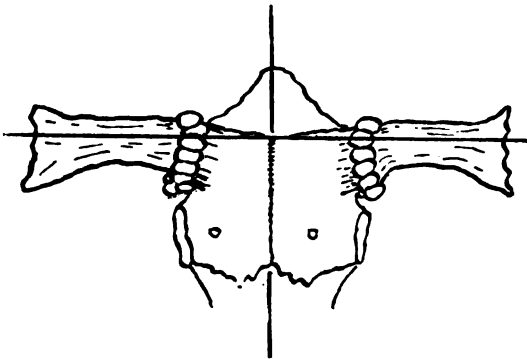


FIG. 63.—FOREHEAD OF ELK, TO SHOW PLACE OF ORIGIN OF ANTLERS.
(After Cameron.)

elk, the roe, and the reindeer, the former condition obtains, those of the New World, with the single exception of the wapiti, present the second condition.

The first of the Asiatic deer with these lower splint-bones is the elk (*Alces machlis*), of which the antlers are shown in Figs. 63, 64. The most obvious characteristic of the elk is to be found in its

enormously expanded antlers, which rise from the sides of the skull by a narrow beam directed horizontally at right angles to the middle line of the skull, without either brow, bez, or trez-tine, and then expand into the well-known form. In com-

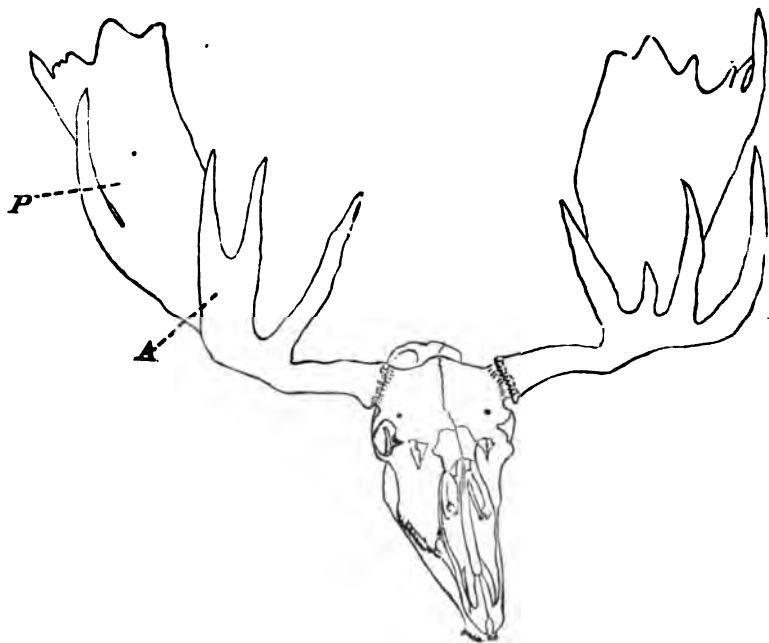


FIG. 64.—SKULL AND ANTLERS OF THE ELK. *A* Anterior, *p* Posterior Branch.
(After W. B. Scott.)

paratively young individuals (Fig. 64) the expanded basin-shaped portion of the antlers consists of an anterior and posterior branch, but in old animals these two moieties unite to a great extent, although

a deep slit on the outer edge of the antler marks their original division. Another peculiarity of the elk is to be found in its broad and overhanging muzzle, which differs from that of the true deer in being covered with hair, with the exception of a small triangular bare patch below the nostrils.

An animal so different as is the elk from all other deer might have been expected to have retained undisputed possession of its name; but, as we have seen, the name elk is very generally transferred by sportsmen to the Indian sambar, while the elk itself is often designated by its American title of moose; and, to add to the confusion, in America the wapiti is very generally termed elk. Elk are essentially northern animals, and inhabit the forest-regions of both hemispheres where snow lies on the ground throughout a long period of the year. Although nowhere numerous, they are distributed in Asia throughout a large part of Northern Russia, Siberia, and North China, having been recorded from the Government of Orenburg, in the west, to Amurland, in the east. Elk vary much in regard to size and the development of their antlers, according to the amount of food to be obtained in the districts they inhabit, this food consisting largely of the leaves and twigs of aspen, poplar, willow, and birch. When the antlers are fully developed, they may weigh as

much as 60lb., and may carry as many as fourteen or fifteen points along the outer edge of the basin of each. In America they have been obtained with a length of $35\frac{1}{2}$ in. from base to tip, and with a basal circumference of $8\frac{1}{2}$ in. Such antlers, it need hardly be observed, form some of the most magnificent cervine trophies that the sportsman can hope to obtain; and as an adult male elk may stand as much a 6ft. 4in. (19 hands) at the withers, this animal may well dispute with the wapiti and other large true deer the right to be regarded as the finest representative of its tribe.* The ungainly build of the elk compares, however, very unfavourably with the more elegant form of the wapiti and its kindred. There has been some difference of opinion as to whether the Asiatic and American elks belong to the same species, but the question has now been answered in the affirmative. Young elk are uniformly coloured, like the adult.

XI.—THE CHINESE WATER-DEER.

The transition from an animal of the stately dimensions of the elk to one of the size of the

* Mr. Parker Gilmore states that the largest moose he has seen stood 19 hands; and, although Prof. Garrod stated that 8ft. (24 hands) was sometimes reached, this is very doubtful.

muntjac may seem somewhat abrupt, but our next representative of the Asiatic deer is the small Chinese water-deer (*Hydropotes inermis*), which, with the exception of the musk-deer, is the sole representative of the family without antlers in either sex. To compensate for the absence of these weapons of offence and defence, the male water-deer—like the musk—is provided with enormous

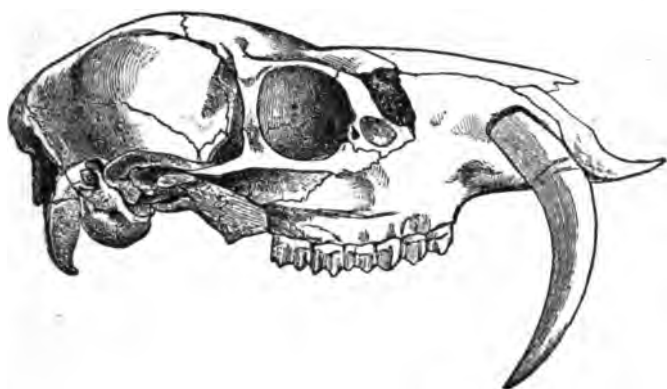


FIG. 65.—SKULL OF THE CHINESE WATER-DEER, WITHOUT THE LOWER JAW. (After Brooke.)

sabre-like tusks in the upper jaw, as shown in the accompanying figure. The water-deer is a short-legged and long-bodied animal, of a reddish-brown colour, and differs from all other members of the family in producing at a birth from three to six fawns, which are spotted.

In the absence of antlers and the presence of

tusks, the water-deer looks so like a musk-deer that the uninitiated would doubtless be disposed to put the two creatures side by side. The anatomist, however, steps in, and shows that, while the internal structure of the water-deer conforms to that obtaining in the present group of deer, that of the musk-deer is widely different. The water-deer inhabits the islands of the Yang-tse-Kiang river in Eastern China, among the reeds of which it appears to be abundant, going in parties of two or three. They are commonly killed by English sportsmen with buck-shot; and when disturbed hog their backs, and scour away in a series of rapid leaps.

XII.—ROE DEER OR ROE.

With the roe deer we come to a group of small deer well known to all British sportsmen through its European representative. In these deer the antlers (Fig. 66) are less than twice the length of the skull, and commonly have three tines each, the brow-tine rising from the upper half of the beam, which divides at its summit into a simple fork. Another characteristic of the roe is to be found in the extreme shortness of the tail, while the absence of tusks forms an important distinction from the water-deer. The fawns are spotted.

The common roe (*Capreolus caprea*) stands a little over two feet at the withers, and resembles the members of the red-deer group in having a white patch on the rump. Common over a large part of Europe, it enters Asia in Northern Persia and the neighbouring regions. Its antlers are unusually prone to develop "sports"; some extremely complex specimens of such abnormalities being in the collection of Lord Powerscourt. The Tartarian



FIG. 66.—SKULL OF ROE DEER.

roe (*C. pygargus*), which inhabits suitable localities in the mountains forming the watershed between the Russian and Chinese empires and Turkestan, is a larger form, regarded by many writers as a variety of the common roe, but considered by Sir Victor Brooke as a distinct species. It has more hairy ears, and a larger white patch on the rump. In Mantchuria there is a small roe, which, according to

the same writer, differs from both the other forms in some details of coloration, and may constitute a third species. Possibly, however, all these may prove to be merely local races of a single species.

XIII.—THE REINDEER.

The reindeer (*Rangifer tarandus*) differs from all the other members of the deer family not only in the peculiar form assumed by its magnificent branching antlers, but likewise by the presence of these appendages in both sexes. A further peculiarity is to be found in the circumstance that the whole of the muzzle is covered with hair. The antlers of the reindeer are of enormous size in comparison with the dimensions of the skull. First of all, they give off a brow-tine which, in the American race (Fig. 68), and in many of the antlers found in the peat and other superficial deposits of this country (Fig. 67), is branched on one side and simple on the other. Above this is a branched tine, probably corresponding to the bez-tine of the red deer group (Fig. 58, A). Then we have an angulation in the beam, from the posterior side of which is given off a small snag (in Fig. 67 present only in the left antler, and in Fig. 68 in the right one),

apparently representing the surroyals of the red deer, while the remainder of the antler may correspond to the trez-tine of the latter; if, indeed, those of the two genera are really constructed on the same essential plan. The extremity of this



FIG. 67.—SKULL AND ANTLERS OF THE REINDEER. From a specimen dug up in Norfolk. (After Owen.)

main anterior branch, as well as those of the brow and trez-tines, are more or less markedly flattened and palmated. The reindeer is characterised by its massive and clumsy build and short

limbs, as well as by the great extent to which the two main hoofs of the foot are capable of being expanded, for the purpose of affording additional support in traversing snow. Like those of the elk,

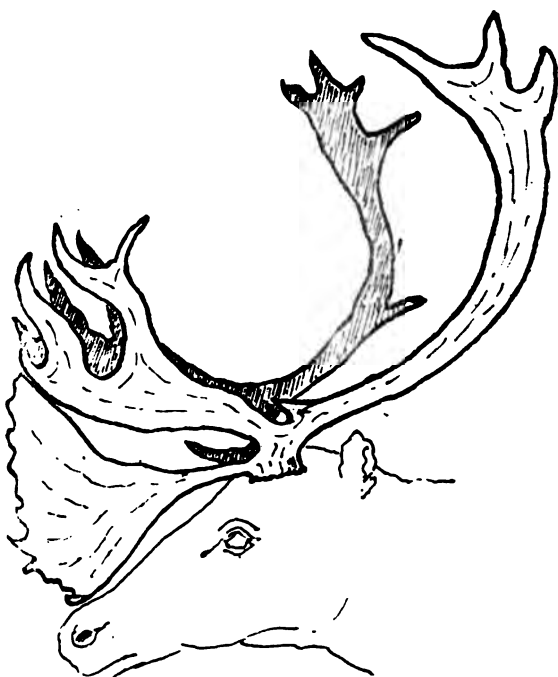


FIG. 68.—HEAD OF NEWFOUNDLAND REINDEER. (After Cameron.)

the young are devoid of spots. The reindeer inhabits the circum-polar land of both hemispheres, and although in America it is known by the name of caribou, there is no satisfactory specific distinc-

tion between the eastern and western races. It extends almost to the extreme limits of the land, and in Europe and Asia its southern geographical range is approximately limited by the parallel of latitude 52deg. Nordenskiöld tells us that "the life of the wild reindeer is best known on Spitzbergen. During summer it betakes itself to the grassy plains in the ice-free valleys of the island; in late autumn it withdraws—according to the walrus-hunters' statements—to the sea coast, in order to eat the seaweed that is thrown up on the beach. In winter it goes back to the lichen-clad mountain heights in the interior of the country, where it appears to thrive exceedingly well, though the cold during winter must be excessively severe, for when the reindeer return in spring to the coast they are still very fat; but some weeks afterwards, when the snow has frozen on the surface and a crust of ice makes it difficult for them to get at the mountain sides, they become so poor as to be scarcely eatable. In summer, however, they speedily feed themselves back into good condition, and in autumn they are so fat that they would certainly take prizes at an exhibition of fat cattle."

XIV.—THE MUSK-DEER.

The musk-deer, or simply musk (*Moschus moschiferus*), which, together with another species from Central Asia, is the last of the Asiatic deer, differs in its internal structure so remarkably from all other members of the family to which it belongs, that it is regarded as representing a group of equivalent value to another containing the whole of the latter ; some writers, indeed, going so far as to make it the type of a separate family. Although the musk resembles the Chinese water-deer in the absence of antlers in both sexes, and also in the presence of large sabre-like tusks in the upper jaw of the males, yet it differs from that and every other species of deer in having a gall-bladder in the liver, and it is this characteristic which affords one of the main grounds for separating the species from all the other members of the family.

The musk-deer, or kastura, as it is termed in Hindustani, is so well known to all Himalayan sportsmen, that our remarks concerning it will be brief. The chief external peculiarities are the remarkable shortness of the tail, the large size of the lateral hoofs, the great mobility of both these and the large middle hoofs, and the extreme coarseness and brittle nature of the hair. The hair, as we have already had occasion to mention, is, indeed, almost indis-

tinguishable from that of the South African klip-springer; a circumstance which, to say the least, is remarkable in animals living under such totally different climatic conditions, and belonging to such widely-sundered groups.

The range of the musk-deer includes the whole of the Himalaya, as far west as Gilgit, as well as a large area in Central Asia, extending northwards into Siberia, while to the eastwards it embraces Cochin China. The height of the animal at the withers is about twenty inches, and the tusks of adult males are between two and three inches in length, exclusive of the portion embedded in the jaw-bone. Individuals and local races vary greatly in colour.

Of the habits of the *kastura* good accounts are given by General Kinloch in "Large Game of Tibet," and also by General Macintyre in his "Hindu-Koh." They are solitary animals, and in the spring are generally to be found in birch woods at comparatively high elevations when the winter snows are melting. At the time that the writer knew the Kashmir Himalaya musk-deer were especially abundant in the valley of Tilel, lying to the north of Kashmir proper. They may be killed either with a bullet or with buck-shot, and, owing to their yielding the precious musk, they are much more sought after than would otherwise be the case.

Recently a second species—the Kansu musk (*Moschus sifanicus*)—has been described from Kansu, in North-western China, adjacent to Tibet.

We cannot bring this chapter to a conclusion without a word of reference to the so-called mouse-deer, or chevrotains, of India and the adjacent regions, which are almost universally included in popular estimation among the deer, and are generally placed next to the musk, to which they have a certain external resemblance. As a matter of fact, however, these animals are structurally quite different from the true ruminants (deer, antelopes, giraffe, &c.), and form a separate group exhibiting marked features of affinity with the pigs on the one hand, and with the camels on the other.

CHAPTER VII.

THE DEER OF SOUTH AMERICA.

OWING to the numerous varieties of closely-allied deer inhabiting Central and South America, and the slight differential characters by which several of them are distinguished from one another, this group has always been, and is still likely to remain, a stumbling-block alike to the zoologist and to the sportsman. The circumstance that as we pass from North to Central and South America we can trace a gradual diminution in the bodily size and the degree of development of the antlers of allied kinds of deer, renders it extremely difficult, if not impossible, to know where to draw the line between species and varieties; and thus the specific determination of individual specimens from unknown localities is a very hard task indeed. Added to this, is the further difficulty that the particular specimens, on the evidence of which certain so-called distinct species have been founded, are preserved in various museums, so that the actual comparison between

them is impracticable. Moreover, the Natural History Museum at South Kensington is remarkably weak in specimens of South American deer, so that we cannot get a good idea of the range of variation in their antlers. There are on our lists, therefore, the names of several nominal species which in all probability have no real right to be maintained, but which we cannot definitely say should be abolished.

With these difficulties and uncertainties, it is no wonder that inquiries are frequently made by sportsmen as to the particular species to which their cervine trophies from these regions should be assigned—inquiries which, as already indicated, are not always readily answered. Frequently such trophies are in the form merely of the skulls and antlers, or even of the frontlet and antlers; and since the colour of the pelage, length of the tail and ears, mode of arrangement of the hair on the face, and other external characters, are of considerable importance in the discrimination of the groups or species, it is most desirable that the whole skin should be at the disposal of the authority to whom the specimens are submitted, or, failing this, that careful observations on these points should be recorded from the freshly-killed animal. Moreover, the exact localities where specimens were

killed should always be most scrupulously registered. The following remarks are intended to aid the sportsman in these respects, by giving a brief summary of the extent of our knowledge on this interesting subject.

Putting on one side the reindeer (caribou) and the elk (moose), which are sufficiently distinguished by the character of their antlers, the whole of the deer of the New World, with the exception of the wapiti, belong to a group markedly distinct from all the Old World deer, of which, as we have seen in the preceding chapter, by far the greater majority are included in the genus *Cervus*. Unfortunately, however, the most important characters by which the New and Old World deer are distinguished from one another are deep-seated anatomical ones, not apparent in the living animal, and therefore requiring some technical knowledge to fully comprehend. The chief of these internal peculiarities are connected with the structure of the hinder part of the palate, and of the bones of the lower portion of the leg; those connected with the leg, having been noticed in the chapter referred to, need no further mention here.

As regards external characteristics, none of these American deer attain very large dimensions, and several of them are very small; while the colour of

the body in the adult is uniform. In many of them the antlers, when contrasted with those of the typical Old World deer, are relatively small, and in the smaller forms they may be reduced to mere simple spikes. A few of the larger species have, however, antlers of a more complex type. Whether, however, they be simple or complex, the antlers of all the members of the genus *Cariacus* may, as Mr. Allan Gordon Cameron* has so ably pointed



FIG. 69.—ANTLERS OF YOUNG MULE-DEER. (After Cameron.)

out, be readily distinguished from those of all species of *Cervus*. Thus in all cases where they are not simple spikes, the antlers of the American deer divide in a fork-like manner with the front prong directed forwards over the forehead; the simplest type of such a forked antler being shown in Fig. 69. Moreover, although, as in the white-tailed deer

* *Field*, April 30 to June 14, 1892.

(Fig. 70), there may be what is termed a sub-basal snag, there is never a brow-tine.* While still preserving this forked type of structure, the antlers of the American deer undergo a large amount of specific variation, some forms having the two prongs of the fork nearly equally developed, while in others the front prong may become greatly enlarged, and the hind one proportionately reduced in size. The skull of the American deer is distinguished by its long and narrow shape, and by the great size of the aperture below the eye connected with the "tear-bag" or crumen. The tail may be either long or short. It may be mentioned here that the latest geological discoveries confirm Mr. Wallace's views as to these deer being comparatively late immigrants into South America, their remains being quite unknown in the older mammal-yielding strata of that continent.

With his usual fondness for making much of slight points of distinction, and needlessly multiplying technical names, the late Dr. Gray proposed to arrange the American deer in no less than eight separate genera. In an important paper by Sir Victor Brooke, published in the "Zoological

* Sir Victor Brooke correlated the sub-basal snag with the brow-tine of the Old World deer, but Mr. Cameron has conclusively shown that this is incorrect.

Society's Proceedings" for 1878, we find, however, a much simpler arrangement proposed—the whole of the species, with the exception of a small and peculiar one from the Andes of Chili, being grouped under a single genus, with the name of *Cariacus*. This genus was divided into four distinct groups, of which the first three are closely related, while the fourth is somewhat different. Most modern authorities have agreed to accept this classification; but in a paper published by Mr. F. W. True in the "Proceedings of the United States National Museum" for 1888, it has been proposed to raise Sir V. Brooke's fourth group to the rank of a distinct genus, under the name of *Coassus*. On the other hand, Mr. Sclater, in his "List of the Animals in the Zoological Society's Gardens," regards the third group as a genus, under the name of *Furcifer*. With regard to this point, we shall have something more to say in the sequel.

With these preliminary remarks, we are in a position to enter on the consideration of the question of the approximate number of species of deer to be found in South America, and their leading characters.

The first three groups of the genus *Cariacus* are all characterised by having more or less branching antlers, and by the hair on the middle line of the

face being directed uninterruptedly backwards. The naked part of the muzzle is of moderate size, and does not include the whole of the nostrils.

In the first group the skull has large antlers, with a short, upright basal snag rising from the inner side of the beam (Fig. 70); the tail is long; there are no tusks in the upper jaw, and the young are



FIG. 70.—ANTLERS OF WHITE-TAILED DEER. (After Cameron.)

spotted—the first, second, and third characters being those by which it can most readily be identified. This group may be again sub-divided into two sub-groups, the first of which is distinguished by the antlers (Fig. 70), having the anterior branch of the fork greatly developed at the expense of the posterior

one, and also by the pit in the skull below the eye for the tear-bag being only of moderate depth.

This sub-group is represented typically by the well-known Virginian deer and the nearly allied or identical white-tailed deer (Fig. 70) of North America. In Texas, Mexico, Guatemala, Costa Rica, and Panama there is a closely-allied kind, known as the Mexican deer. In examples from Texas and Mexico, the number of tines on the antlers is frequently eight or ten; and one instance is known where there are upwards of sixteen. As we reach Guatemala, Costa Rica, and Panama, and thus enter South America, the representatives of this deer become gradually smaller, and generally have simpler antlers. Proceeding still further south, we find numerous kinds of long-tailed deer, with smaller antlers than the preceding, which have received distinct specific names. Thus in Guiana and Venezuela we have one called *C. savannarum*; in Peru, *C. peruvianus*; while the locality is unknown from which the skull described as *C. similis* was obtained. All these forms are, however, so closely allied to the Mexican deer that Sir Victor Brooke considered that, in all probability, they are only varieties of that species. It is further suggested that *C. mexicanus* itself may be only a local race of the Virginian deer (*C. virginianus*), there being a well-ascertained tendency in several

species of mammals whose headquarters are in North America to diminish in size, as well as in the degree of development of their appendages, as they advance southward. Most authorities, however, recognise the Mexican deer as a distinct species. It will suffice, therefore, for the sportsman who shoots large, long-tailed South American deer with no upper tusks, antlers in which the anterior prong of the fork is greatly developed, and furnished with three tines, and comparatively small ears, to call them *C. mexicanus*, with the proviso that this may possibly be only a race of *C. virginianus*, of smaller dimensions than ordinary.

An apparently distinct species is the naked-eared deer (*C. gymnotis*) from Colombia (New Granada) and Ecuador, distinguished from the preceding by the large and drooping ears, of which the outer surface is naked, the extreme narrowness of the head, and the elegance and slenderness of the whole build. Females of this species have been exhibited in the Zoological Gardens. There is some doubt as to whether the Central American *C. yucatanensis* is a distinct species, and, if so, whether it ranges into South America.

The members of the second sub-group are readily distinguished from the preceding forms by the two branches of the fork of the antlers being nearly equally developed, and the small size of the sub-

basal snag (Fig. 71). Thus, a short distance above the small sub-basal snag the beam divides into a large open fork, the front and hind branches of which again fork in a regular manner. The skull may be distinguished from that of the preceding sub-group



FIG. 71.—ANTLERS OF MULE-DEER. (After Cameron.)

by the deeper pit below the eye. As this sub-group, of which the best-known member is the mule-deer (*C. macrotis*), does not occur in South America, it is mentioned here merely to show how its antlers differ from those of the next group.

The second main group of the genus *Cariacus* is confined to the southern half of the American continent. Here the large antlers (Fig. 72) have completely lost the small sub-basal snag found in the typical-group, and the short beam forks into two branches, of which the hinder one is usually the larger; the hinder branch always divides again, but the front one may be either undivided, or form a single fork. The skull is like that of the first group, having no upper tusks, and the pit below the eye deep. In the tail being short, and the young of uniform colour, this group differs from the preceding one. Their range embraces the eastern and southern portions of the continent.

The absence of a sub-basal snag to the forked and branching antlers, and the shortness of the tail, afford ample characters to distinguish this group from the preceding sub-group; the two known species are also of somewhat smaller size.

Of these species, the larger is the marsh-deer (*C. paludosus*), found on the eastern side of the lower middle portion of South America, in South Brazil, Paraguay, Rio Grande do Sul, and Uruguay; its western range being probably bounded by the Parana river. The antlers (Fig. 72) vary considerably in different individuals, but are characterised by their stoutness and rugged surface, the front as



FIG. 72.—ANTLERS OF PAMPAS DEER (upper figure) AND MARSH-DEER. (After Cameron.)

well as the hinder branch being usually forked. It would seem probable that the imperfect skull with antlers from Brazil preserved in the Natural History Museum, and figured by Dr. Gray in his "Hand-list of Ruminant Mammals," under the name of *Blastocerus sylvestris*, really belongs to a small individual of this species, the antlers, though small, being stout. No mention of that specimen is, however, made in Sir Victor Brooke's paper, which professes to include all the species, so that we have not the advantage of the writer's opinion on this point.

Two skulls of the marsh-deer in the Natural History Museum are remarkable for having the hinder branch of their antlers smaller than the front one, whereas the reverse of this is usually the case. In one of them the hinder branch of the right side forms only a single prong, although it is forked on the opposite side.

The pampas or Guazuti deer (*C. campestris*), which is likewise found in Paraguay and Uruguay, but crosses the Parana river into Argentina, and thence ranges into Northern Patagonia, is a smaller species, with much more slender and less rugose antlers, in which the front branch usually forms an undivided prong, as in the upper figure in Fig. 72. The height of this species is about $2\frac{1}{2}$ ft., and it is altogether of lighter build than the last.

With the third group we come to the guemals, constituting the genus *Furcifer* of Mr. Sclater's arrangement. They are readily distinguished from the preceding group by the extremely simple character of their antlers, which consist of a single fork, of which the front prong is the longer; and also by the presence of tusks in the upper jaws of both males and females. They are of medium size, and exclusively confined to the Andes, so that they are essentially western forms. The young are not spotted.

Two species of this group are recognised, the first being the Chilean guemal (*C. chilensis*), ranging in the Andes from near Santiago to Magellan but far more scarce in the north than in the south of this area. The second, or Peruvian guemal (*C. antisiensis*), is a more northern form, confined to the Peruvian Andes, and distinguished from the former by certain external characters which would require a somewhat detailed description to notice fully.

Occasionally, individuals of these deer exhibit abnormal and branched antlers; and it was on the evidence of an imperfect skull with such antlers, from Chili, that Dr. Gray established the genus *Xenelaphus*—the specimen in question really belonging to *C. antisiensis*.

Although not coming strictly within the scope of the heading of this chapter, a very remarkable deer from Central America, known as the Costa Rica deer (*C. clavatus*) deserves mention on account of indicating a type connecting the preceding groups with the following one. It was described by Mr. True in the paper to which reference has already been made, and is a comparatively small species, with simple spike-like antlers inclining backwards nearly in the line of the face. It has the uniform reddish-yellow coloration of the Virginian deer, which it much resembles in general appearance; but the tips of the hoofs are yellow. In the characters of the skull, and also in the direction of the hairs on the face, this species agrees with all the preceding forms, and is, therefore, markedly distinct from the next group.

The brackets—constituting the last group of the genus *Cariacus*—are small South American deer, with simple prong-like antlers, and the hair on the middle line of the face radiating in all directions from two points, one of which is situated on the crown of the head, and the other below the eyes. The naked part of the muzzle is large, and completely surrounds the nostrils; and tusks may or may not be present in the upper jaw. The young are spotted. There are four well-defined species

(the largest of which does not exceed 27in. at the withers) and two doubtful ones.

The red brocket (*C. rufus*) inhabits Brazil, and is chiefly or entirely characteristic of the north-eastern portion, where it ranges from Surinam to Pernambuco. Its height is 27in. at the shoulder, the build is heavy and clumsy, and the colour reddish-brown.

The Brazilian brocket (*C. simplicicornis*) is a smaller species, not exceeding 21in. in height at the shoulder. It appears to be widely spread in Brazil, and also extends westward into Colombia (New Granada). The colour is brown when young, and never attains such a full red as in the last species, from which this deer is readily distinguished by its lighter and more graceful build.

In the cavern-deposits of Lagoa-Santa, in the district of Minas-Geraes, Brazil, so well known through the researches of the late Dr. Lund, remains of brockets are found which probably belong to one or both of the above mentioned species.

Of still smaller dimensions is the Ecuador brocket (*C. rufinus*), the height of which is only 19in. It occurs typically in Ecuador, but, according to Dr. Gray, is also found in Colombia and Venezuela, whence it ranges into Central America in Guate-

mala. When adult it is of a full glossy red colour, with the face and fore legs shaded a bluish-brown tint.

The wood brocket (*C. nemorivagus*) is of the same height as the last, but differs from all the others by its pepper-and-salt colour. Its range, although not fully known, is probably extensive on the eastern side of the continent. It is recorded by Sir Victor Brooke from Surinam; and a specimen in the Zoological Society's Gardens was obtained from Trinidad. It probably occurs fossil in the caverns of Lagoa Santa.

There appear to be considerable doubts as to the specific distinctness of a reddish brocket described by Dr. Gray as *C. superciliaris*, and said to be from Brazil.

Still less can be said as to *C. whitelyi*, founded upon the evidence of an immature skull from Peru, described by the writer last mentioned. If rightly referred to this group, the region whence it was obtained may indicate that it is a good species.

If the guemals are included in the genus *Cariacus*, it does not appear that there are sufficient reasons to induce us to adopt Mr. True's proposal to separate the brockets as *Coassus*.

The last of the South American deer is the pudu,

from the Chilian Andes—a species so different from all the others that it has been made the type of a distinct genus under the name of *Pudua humilis*. This deer, which is scarcely larger than a hare, is of a reddish-brown colour, having antlers in the form of minute spikes, not very widely separated from one another. It is distinguished from the brockets by the bones forming the extremity of the muzzle (the premaxillæ) extending upwards to join those roofing the cavity of the nose (nasals), a feature in which it resembles the guemals of the same region, and differs from all the other groups. There are also certain peculiarities in regard to the bones of the ankle joint, unknown in any of the other forms. There are no tusks in the upper jaw. This elegant little deer has been exhibited in the Zoological Society's Gardens.

This closes the survey of the South American deer, and from it will be gathered the unsatisfactory state of our knowledge of the group. At the end of his summary of the species Sir Victor Brooke remarked upon the difficulty of arriving at any satisfactory conclusion as to the number of valid species, even after an examination of the specimens in the English and nearly all the Continental museums, as well as those in his own private collection. As no other authority has made a

similar examination, and the collection of the British Museum has not received any notable accession of specimens since that date, it seems little short of impossible at present to arrive at any more definite results.

CHAPTER VIII.

WILD PIGS.

PROBABLY the great majority of those who have enjoyed the sport of "pig-sticking" in India think—if they think at all on the subject—that the animal which affords them their sport belongs to the same species as the wild boar of Europe. For instance, Sir Samuel Baker observes "there is very little marked distinction among the wild hogs of Europe and Asia. The conditions of localities, and the abundance of food, or the reverse, exert a natural influence upon its size, but were a photograph taken of a wild boar in Europe and Asia Minor, there would not be any perceptible difference. Throughout India and Ceylon they are the same in general appearance, differing somewhat in size, and, to a certain extent, in length of bristles, according to the influence of temperature. In cold climates the pig is protected by a growth of coat in proportion to its requirements, but in all other respects it is much the same, and it would be difficult to distin-

guish any features that would constitute a separate variety."

To a very great extent the above statements are perfectly true, and it is not to be wondered at that writers who are sportsmen rather than technical zoologists should fail to distinguish satisfactorily between the European and the Indian wild pigs. Indeed, the whole group of wild pigs allied to the common species are so like one another that even zoologists themselves are at issue as to the number of species that ought to be recognised, although it is quite certain that there are several which must be regarded as distinct. In spite, however, of the tendency of sportsmen to fail in distinguishing satisfactorily between the Indian wild pig and its European cousin, it is not uncommon in sporting works to find the former referred to under the name of *Sus indicus* (which, by the way, is not its proper title). Now this assignation of a separate name to the wild pig of India implies its specific distinctness from the European wild boar (*Sus scrofa*); and since distinctions which cannot be defined are valueless, our attention must first be directed to those points of difference from the latter which naturalists consider of sufficient importance to entitle the Indian pig to rank as a distinct species. The most marked external characteristic by which the Indian wild pig

differs from the European species is the much greater development of the crest or mane of coarse bristles on the nape of the neck and back. It is from this feature that the Indian pig derives its name of *Sus cristatus*, which is the earliest, and, therefore, the proper title; and since the greater development of hair on the neck is clearly the exact reverse of what we should expect if such

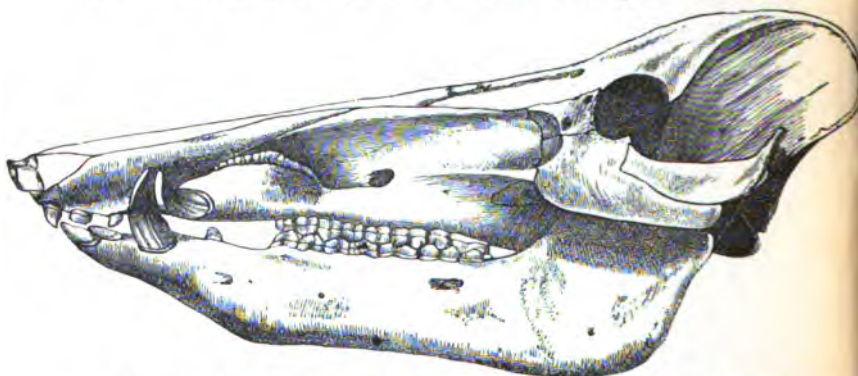


FIG. 73.—SIDE VIEW OF THE SKULL OF THE BEARDED WILD PIG OF BORNEO. (After Nehring.)

variations, as Sir Samuel Baker suggests, were dependent upon climate, we have in this respect a *prima facie* reason for regarding the animal as a distinct species. The evidence for its distinctness does not, however, rest here, for if we examine the skulls of an Indian and a European wild boar we shall find that they can be distinguished by their teeth. It is, perhaps, scarcely necessary to say that

in the skull of an ordinary wild hog (Fig. 73) there are seven grinding-teeth on either side of each jaw, placed posteriorly to the tusks. Now, of these grinding, or cheek-teeth, the last in the lower jaw is always larger and more complex than those in front of it. This tooth consists, indeed, of three transverse moieties, or lobes (Fig. 74), of which the hindmost, or that situated on the left side of the figure, is subject to considerable variation in the different species of pigs, and it is upon this variation



FIG. 74.—THE LAST RIGHT LOWER CHEEK-TOOTH OF A PIG.

that the second point of distinction between the Indian and the European wild pigs depends. In the European wild pig the hindmost lobe of the tooth in question is not more complex than in the figured example, but in the Indian species—especially in boars—it is complicated by the addition of one or more extra cusps on the hinder end, thus making the whole tooth considerably larger and more complex. Moreover, nearly similar differences may be observed in the last upper tooth of the two forms,

although they are not quite so readily apparent as in the case of those of the lower jaw.

Such, then, are the points by which the Indian *Sus cristatus* is mainly distinguished from *Sus scrofa* of Europe. To those who are not professed zoologists these differences may, indeed, seem of slight import and scarcely noteworthy; but since they are perfectly constant there can be but little hesitation in accepting them as characters worthy of specific distinction. To this, it may be added, that as most of the mammals of Peninsular India are distinct from those of Europe, it is probable that, *primâ facie*, the same would hold good for the pigs. The Indian wild boar is also a rather taller and more "leggy" animal than his European cousin, while his coat of hair is much thinner and more scanty. Since, however, the latter difference may, as Sir Samuel Baker suggests, be perfectly well explained as being due to climate, we do not bring it forward as an essential characteristic of the species.

The Indian wild pig is found over the whole of Burma, Ceylon, and India, extending as far into the Himalaya as the valley of Kashmir. According, however, to Mr. Blanford it is probable that it is replaced in Baluchistan and Persia by the European wild boar, which is known to extend into Central Asia as far as Yarkand, and is also found in Asia

Minor and Northern Africa. In height the Indian wild pig usually varies from about 30in. to 40in. at the shoulder, but we are informed that one of 43½in. has been recorded from Eastern Bengal.

As in the case of all animals with teeth growing continuously throughout life, and only prevented from attaining undue size by the wear of those of one jaw against those of the other, pigs are liable to an abnormal growth of their tusks or "tushes" from the effects of accident. In such cases, when one tusk—say the upper—has been damaged so as to be unable to wear against the opposing tusk of the lower jaw, the latter having no check to its growth, will attain extraordinary dimensions. One of the most remarkable instances of the abnormal growth of a lower tusk was described by Mr. Moray Brown.* The animal to which this specimen belonged was killed in the *churs* of the Bramaputra, and the skull is now preserved in the East India United Service Club. The abnormally developed lower tusk is on the right side, and it appears to have grown until its point came into contact with one of the cheek-teeth, by which it was deflected. The other end then seems to have grown right through the bone of the jaw, thus causing it need hardly

* *Land and Water*, May 23, 1891.

be said, intense suffering to the unfortunate animal during life. The Royal College of Surgeons possesses part of the lower jaw of a domestic boar in which both tusks are developed in the same abnormal manner.

It must not, however, be supposed that *Sus cristatus* is the only wild pig found in the Indian dominions, the fact being that there are two other well-marked species. The first of these is the Andaman pig (*Sus andamensis*), restricted to the forests of the Andaman Islands, and readily recognised by its comparatively small size, the height at the shoulder averaging only some 2oin. This pig is further characterised by its relatively short tail, shaggy coat, and the absence of a distinct crest on the neck; while the skull may be at once distinguished by the shortness of the hinder lobe of the last tooth in the lower jaw.

The smallest of all the pigs is, however, the pigmy hog (*Sus salvanius*), from the forests of the "Terai" land, along the foot of the Himalaya in Nipal, Sikhim, and Bhutan. These tiny little pigs, of which specimens have been exhibited from time to time in the Zoological Society's Gardens, are scarcely larger than hares, a full-grown boar standing only a little over 11in. at the shoulder. Owing to their habit of remaining concealed in the

forests during the day, and only issuing forth to feed at night, they are seldom seen, and but little is known of their mode of life in a wild state. If, however, we may judge by the circumstance that the female has but three pairs of teats, in place of the usual six, it is probable that they produce fewer young than other pigs.

As a contrast to the pigmy hog, we may mention that in past times India was the home of the largest pigs yet known, the skull of one of these enormous extinct species measuring 23in. in total length, whereas about 16in. is the length of an average-sized living Indian wild pig. Judging from these proportions, it would seem that these fossil pigs must have been as tall as a good-sized mule. Imagine a charge from such a monster !

The greatest development of wild pigs belonging to the typical genus *Sus* occurs, however, in the islands of the Malayan region, and thence to Japan, but there is still great uncertainty as to the real number of species, some writers reckoning as many as ten distinct kinds, while others only admit three or four. Without entering into technical details, it will suffice for our present purpose to mention that these East Asian pigs constitute three well-marked groups. The first of these groups is represented by the collared pig (*Sus vittatus*) of Java, Sumatra,

Borneo, &c., which is closely allied to the wild pig of India, but without the crest of hair on the neck, and with a white streak running along the side of the face to the neck. The wild pigs of Japan, Formosa, and New Guinea are very nearly related to this species, although they have all received distinct names. In Java and Borneo we find another very distinct species known as the warty pig (*Sus verrucosus*), which, by the way, must not be confounded with the wart-hogs of Africa—readily recognised by the presence of three small warts on each side of the face; the largest of these being placed just below the eye, and covered with bristles. The wild pigs of Celebes, the Moluccas, and the Philippines are nearly allied to this species. Lastly, we have the bearded pig of Borneo (*Sus barbatus*), in which the cheeks are fringed with long hairs. The most distinctive feature of this species is, however, to be found in the great length of the skull (Fig. 73); this may be made manifest by comparing the figure with the skull of an Indian wild boar, when it will be noticed that the first grinding-tooth in the upper jaw is separated by a considerable interval from the tusk, instead of being placed close behind it. Another distinctive feature of the bearded pig is to be found in the extreme shortness of the last tooth in the lower jaw.

With the exception of the occurrence of the European wild boar in Algeria and Morocco, and of another nearly related species in Senaar, both of which may probably be regarded as comparatively recent immigrants, there are no wild pigs allied to *Sus scrofa* throughout Africa. In this respect, therefore, the Dark Continent presents a condition similar to that which obtains in the case of the deer, as we have noticed in a previous chapter; and we may add that there is a similar peculiarity of distribution among the bears, which, with the exception of one species in the Atlas range, are quite unknown in Africa. It must not, however, be inferred from this that there are no wild pigs in Africa; the fact being that these animals are represented there by two groups quite different from those found in any other part of the world. The second of these groups will be noticed later on. The first group is represented by the river-hogs, of which there are two species differing considerably in external appearance. Both these pigs may be recognised by their long snouts, and the presence of a large swelling below the eye, caused by a projecting mass of bone over the sheath of the upper tusk. Moreover, if we examine adult skulls of these pigs we shall find that they never have more than six (instead of the usual seven) teeth behind the tusk in the lower jaw, and generally

only the same number in the upper jaw. The grey river-hog (*Sus africanus*) is a South and Central African species, known to the Boers as the *boschvark* (bush-pig). Mr. Drummond states that "the *ingulabi*, as it is called by the natives, does an

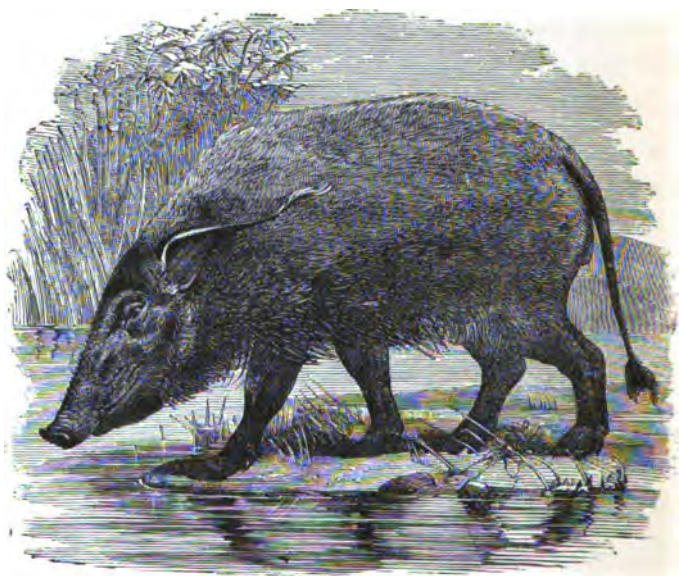


FIG. 75.—AFRICAN RED RIVER HOG. (From Sclater, *Proc. Zool. Soc.*)

immense amount of damage to their sweet potatoes and fields, and has, in consequence, been exterminated in many districts. In no way is it the equal of the larger species (the wart-hog), carrying tusks little longer than those of a domesticated boar,

and affording comparatively little sport to either gun or dogs."

Very different in appearance is the red river-hog (*Sus porcus*) of West Africa, characterised by its full red colour, and the long pencils of hair surmounting the ears. M. du Chaillu describes it as "a very remarkable-looking animal, reaching a great size, and conspicuous for a curious white face, adorned with several large warty protuberances on each side, half way between the nose and eyes. These, and the singular long bristles which surround the eyes and the long ears, ending in a tuft of coarse hair, give the animal a very remarkable expression."

In all the wild pigs noticed above the young are marked by light and dark longitudinal stripes, and, from what we have said in the chapter on the "Deer of Asia,"* it will be inferred that these pigs indicate the most primitive members of the family, the tendency in so many groups of mammals being for the spots or stripes to disappear, first in the adult, and afterwards in the young. All the remaining kinds of wild pigs have uniformly coloured young, and are therefore regarded as what naturalists call more specialised animals, this being confirmed by the structure of their skulls and tusks. In

consequence of these points of difference the pigs to be now mentioned are not included in the genus *Sus*. It will not fail to be noticed that whereas in the pigs referred to above the upper tusks have their summits abraded by wearing against the sides of the lower ones, and are thus much shorter than the latter (Fig. 73), in those to be now noticed there is either no such abrasion, or only a partial one, and the upper tusks are consequently as long as, or longer than, the lower.

The first of these pigs with long upper tusks is the extraordinary-looking babirusa (*Babirusa alfurus*), of Celebes and Boru. This pig takes its name from the enormously-developed tusks of the boars, which assume almost a horn-like appearance, and have thus suggested to the Malays the title of *Babi-rusa*, or "pig-deer." The upper tusks (Fig. 76), while curving upwards like those of an ordinary pig, instead of coming out from the margins of the jaws, arise close to each side of the middle line of the face, and thence sweep backwards, frequently, as in our figure, touching the surface of the forehead, after which they curve forwards. The lower tusks may either have a curvature very similar to that of the upper pair, or, as in our figure, may be much less bent. If these tusks be examined closely, it will be found that they differ from those

of the wild boar by the absence of the hard enamel which forms the external coating of the latter where not worn. In external appearance the babirusa is a rather "leggy" and nearly naked pig, with small ears and a rather short tail. Upper tusks have been



FIG. 76.—SIDE VIEW OF THE SKULL OF THE BABIRUSA. (From Dr. Guillemard's "Cruise of the Marchesa.")

measured with a length of $14\frac{1}{2}$ in.—we believe exclusive of the portion buried in the socket. What can be the use of these extraordinary appendages has given rise to a considerable amount of discussion. The Malays aver that they are for the pur-

pose of enabling the creature to escape from its foes by rushing into water, and holding on by such branches as may lie at the bottom. They are, however, careful to avoid saying how the pig is able to breathe when thus submerged, or how the tuskless female manages to escape her enemies. It has been suggested that the tusks are for the purpose of protecting the eyes of the creature when rushing through the thick jungle, but, although they would undoubtedly do this, their absence in the sows, as Mr. A. R. Wallace pertinently remarks, renders it extremely doubtful if this is their true *raison d'être*. On the whole, the zoologist just quoted considers it most probable that the tusks are organs which were once useful and were then kept within moderate dimensions by wearing against one another, but that for some reason or other they have become unnecessary, and have assumed a monstrous growth like that which has taken place with the lower tusk of a wild boar when the upper tusk against which it should wear has been broken off.

Dr. Guillemard gives the following account of babirusa hunting in Celebes:—"The animals being driven into a 'curral,' with a V-shaped opening, and flanked by netting, we had plenty of time to wait before the sport began, and meanwhile the natives

arranged themselves at their posts. One stood at the door of the curral ready to close it directly any animal rushed in; others took up their places on either side of the wide entrance, while the remainder crouched in front of the long net at intervals of a few yards, each grasping his spear, and hidden from view by a huge *Livistonia* (a kind of palm) frond planted in the ground before him. We had not long been settled before a peculiar barking grunt in the distance announced the arrival of the first victim. Everyone was instantly motionless, and directly afterwards a dark object dashed up at great speed and buried itself in the net a short way down the slope. . . . There was a short struggle, and in less than five minutes the captive, a full-grown female babirusa, was quietly reposing on her back, with her legs tied together with rattan, and we were once more in ambush for the next comer. We were hardly quiet before the same peculiar sound was heard rapidly approaching, and the next moment a magnificent old boar babirusa rushed past within five yards of us, and plunged into the net between our tree and the entrance to the curral. His long tushes became entangled in the meshes, and the natives ran up to spear him. Just at this moment, however, he broke loose, and turning on his antagonists scattered them in all

directions. It was a most determined charge, and, as we were unable to fire for fear of hitting some of our men, it might have proved a serious affair for the native he singled out." Eventually, however, the animal was speared, but "even with four spears buried in his body the old boar died game, striving to the very last to get at his antagonists."

Pigs, at the best, are by no means remarkable for their beauty, but the African wart-hogs (with which we have to close our account) "whip creation," as our American friends would say, for ugliness. In these animals the head is very large in proportion to the body, and is characterised by having a pair of hideous wart-like growths below the eyes, from which both the popular and the scientific names (*Phacochærus*) are derived. Another peculiarity is the extreme flatness of the face, while the eyes are placed unusually far back. The most striking feature of the skull is, however, the enormous size of the upper tusks, which, although somewhat larger in the boars, are greatly developed in both sexes. They curve in an upward and inward direction, and seem so disproportioned to the size of the skull, that, as Sir Samuel Baker remarks, "they appear as though they have belonged to some much larger creature, and had merely been assumed as masquerade." According to the same writer, these

tusks may project as much as $8\frac{3}{4}$ in. from the jaw, and measure 5 in. in girth. Unlike those of the wild boar, they have enamel only at their tips, which soon disappears by use. The lower tusks, although having a nearly similar curvature, are much shorter and more slender, and are coated with enamel, except on their hinder surface. Like the lower tusks of the wild boar, they are ground to a sharp-cutting-edge by wearing against the outer sides of the upper tusks; but instead of wearing away the whole of the upper portion of the latter they merely form smooth facets on their sides. Although young wart-hogs have six upper and five lower grinding-teeth, in old animals the earlier of these, as well as the front teeth, tend to disappear, till in some only the four tusks and the last grinding or molar tooth on each side of the upper and lower jaws alone remain. It might be thought that an animal with only eight teeth, all told, would have but a poor chance of maintaining its existence; but the small number of the teeth of the adult wart-hog is compensated by the great size of those which remain. The last molar of a wart-hog is, indeed, a most extraordinary tooth, being composed of a number of vertical cylinders closely packed together, its whole length from back to front being generally somewhat over two inches, and its vertical height

proportionately large. Strange as is the form of the tooth, it is, however, only an extreme development of the type of structure obtaining in the ordinary pig. In this great development of the last tooth, the wart-hog may be compared to the elephant, which, when fully adult, has likewise but a single molar tooth remaining on each side of its jaws. Indeed, the adult elephant is still worse off, numerically, as regards teeth than the wart-hog, its total number being only six, owing to the absence of lower tusks.

Wart-hogs are widely distributed over Africa, ranging from Abyssinia to Caffraria. We have been unable to find out the name by which these animals are known to the Boers, but, according to Mr. Drummond, among the natives of South-east Africa, they rejoice in the rather uncouth title of *indhlovudawane*. It has been considered that there are two species of wart-hog, of which the common one (*Phacochærus africanus*) ranges over the greater part of the continent, while the other (*P. æthiopicus*) is restricted to South-eastern Africa. The two are, however, so closely allied, that, for the purpose of the sportsmen, at least, it is not worth while to try and distinguish between them.

Sir Samuel Baker remarks that when a wart-hog "becomes excited, it cocks a long thin tail, with

bristles upon either side, like that of an elephant. This appendage is carried straight in the air, as stiff as a stick, which gives the animal a ridiculous appearance." The same writer does not appear to have a very high opinion of the wart-hog as an animal of sport, although he observes they will now and then charge; it is, however, suggested that if hunted with dogs they would show better sport. That they do so is fully proved by Mr. Drummond's account of his own experiences when hunting with dogs in South-east Africa; and it may be observed that Mr. Drummond describes and figures the wart-hog as twisting its tail, when brought to bay, after the manner of an ordinary pig, instead of sticking it out straight in the way mentioned by Sir Samuel Baker. Mr. Drummond writes that he has "seen an old boar on more than one occasion deliberately go away, taking no notice whatever of half a dozen great Boer hounds, none of them much smaller than himself—so long, at least, as they confined themselves to baying and did not attempt to bite. If one, bolder than the rest, did dare to come to close quarters, he would turn round with a sudden effective jerk, which either sent the dog away howling, or left it crippled on the ground." After relating several encounters with these animals, all of which show their ferocity when brought to bay, the same writer

mentions that wart-hogs will not unfrequently seek refuge in the holes of aard-varks or other animals, from which they are with difficulty dislodged. If, however, they do bolt, they have the curious habit of turning a somersault on to the back of the hole instead of coming straight out in the ordinary way, and are thus very dangerous to the unwary, who are exceedingly likely to take their stand on the very spot where this extraordinary manœuvre is performed.

It need scarcely be mentioned, in conclusion, that all wild pigs are exclusively confined to the Old World, their place in nature being taken in America by the peccaries, which represent a distinct family.

CHAPTER IX.

RHINOCEROSSES, ANCIENT AND MODERN.

IT is not uncommon, in works devoted to the sporting rather than to the strictly scientific aspects of natural history, still to find rhinoceroses alluded to as pachyderms, or members of the Pachydermata. Now, although, as being, in every sense of the word, thick-skinned, these animals are undoubtedly entitled to the appellation Pachydermatous, yet the use of this term implies zoological relationships which do not exist. The pachyderms of Cuvier included elephants, hippopotami, swine, rhinoceroses, and tapirs; and, although all these animals belong to the great order of Ungulata, or hoofed mammals, a more miscellaneous assemblage could not well have been got together. As a matter of fact, while elephants represent a distinct group by themselves, the hippopotami and swine are now affiliated with the deer, antelopes, camels, &c., to constitute a second primary group, a third group being formed by rhinoceroses, tapirs, and

horses, all of which agree in having the toe corresponding to our middle finger, symmetrical in itself. For these reasons we hope—although we scarcely venture to expect—that the term pachyderm may, for the future, be allowed to drop into the oblivion it merits.

To those who have not made an especial study of natural history and comparative anatomy, it may seem that there is little in common between such clumsy ill-shapen brutes as the rhinoceroses and neat smart-looking animals like horses and zebras. Palæontology teaches us, however, that the single toe of the horse and its modern allies is but a comparatively recently acquired character; and that, as we go backwards in time there were numerous three or four-toed horse-like animal, with feet so like those of tapirs and rhinoceroses, that there can be no sort of question as to the near relationship of all these three families of animals. Moreover, the whole of them agree in having molar teeth constructed on the same peculiar general plan; this type of tooth (Fig. 77) consisting of an outer wall (which may, as in the figure, be entire, or may be divided into two columns), from which two oblique transverse ridges run towards the inner border of the crown, where they generally terminate in more or less expanded columns. A comparison

of an upper molar tooth of a horse with our figure of that of a rhinoceros will, indeed, reveal a great difference between the two, although a more careful examination will show a general uniformity of plan. Much of the difference between the two is, however,



FIG. 77.—A LEFT UPPER MOLAR TOOTH OF A RHINOCEROS, IN A HALF WORN CONDITION. The lower border of the figure is the inner side of the tooth.

due to the great elevation of the crown of the tooth of the modern horse, and the filling up of the hollows corresponding to those which occur in that of the rhinoceros by the comparatively soft substance known as cement. And it will be found that the molar

teeth of the ancestral horses were very like those of rhinoceroses in their general structure.

Having said this much as to the relationship of rhinoceroses to the other odd-toed ungulates, we may proceed at once to our notes on the former animals, since, whatever may be the case when extinct types are taken into consideration, no one is the least likely to confound a rhinoceros with any other living animal.

Among few groups of our larger mammals has there been a greater diversity of opinion as to the number of species that exist, than is the case among the rhinoceroses. Thus in 1869 the late Dr. Gray considered that he had evidence of no less than ten species of living rhinoceroses, six of which were Asiatic, and the remaining four African. Somewhat later, Mr. Sclater came to the conclusion that there was another Asiatic species different from any of those described by Gray, while some other writers have thought that a hornless rhinoceros from the Sanderbans of Lower Bengal indicated yet another species. If all these so-called species were admitted as valid, the number of living rhinoceroses would thus reach a round dozen. This, however, is not all, for, instead of following the good old Linnæan plan of including all of them in the single genus *Rhinoceros*, Gray came to the conclusion that such an

arrangement was far too simple and straightforward for the needs of the scientific zoologist, and he accordingly split up the living rhinoceroses into four distinct genera, two of which are African and two Asiatic.

Fortunately, however, for the popularisation of zoology there is now a tendency, at least in England, for greater simplicity of arrangement, and all the rhinoceroses are once more included in the old Linnæan genus. Then, again, instead of the ten or twelve species referred to above, most writers are now agreed that there are but five living species of rhinoceroses, two of which are African and three Asiatic.

While agreeing in their clumsy build, and the presence of three toes to each foot, existing rhinoceroses differ from one another, both in regard to the number of their horns, and also as to the presence or absence of tusks and cutting-teeth in the front of the jaws, while there is a further distinction due to the presence of marked folds in the skin of certain species, which are wanting in others.

On the whole, while the variation in the number of the horns seems to be a character of minor importance, the other two points of difference carry greater weight. Thus, whereas two of the Asiatic rhinoceroses have but a single horn apiece, the third,

which is otherwise nearly related, has two of these appendages. On the other hand, the whole of the three Asiatic species have the skin thrown into more or less strongly-marked folds, and are furnished with tusks and cutting-teeth in the front of the jaws; whereas the two African species are distinguished by the absence of both those features.

Both the Asiatic one-horned rhinoceroses have comparatively small and insignificant horns, which afford but poor trophies to the sportsman. In addition to its much larger bulk, and the thicker folds of its tubercle-covered skin, the great Indian rhinoceros (*R. unicornis*), which is strictly confined to the country from which it takes its name, is distinguished from the Javan rhinoceros by the structure of its upper molar teeth—the difference being so great that a single tooth is sufficient to decide to which species it belonged. Thus, whereas the upper molars of the Indian rhinoceros are very similar to the fossil tooth represented in Fig. 77, having a nearly straight outer wall and very tall crowns, those of the Javan rhinoceros have shorter crowns, with the outer wall much curved, so as to form a kind of buttress at the front angle of the tooth (the left top corner of Fig. 77). A further peculiarity connected with the type of molar teeth occurring in the Indian rhinoceros is that the grinding-

surface of the crown forms a nearly level plane ; whereas in the Javan species it is raised into two

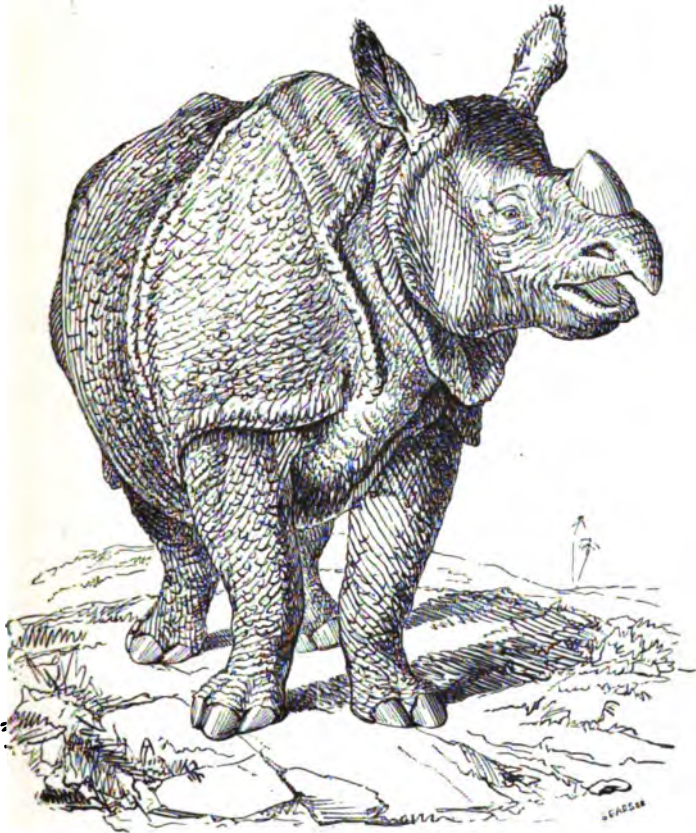


FIG. 78.—THE GREAT INDIAN RHINOCEROS.

The figure is drawn from an aged animal in which the tusks were worn down.

distinct ridges. In consequence of this difference, the jaws of the Indian rhinoceros have mainly a

grinding motion, from back to front and from side to side, after the manner of a horse; whereas, in the other species, the motion is more of a "champing" kind, like that we may observe in a pig. These features indicate that the Indian rhinoceros is what naturalists call a more specialised animal than its Javan cousin.

Then, again, whereas the females of the Indian rhinoceros have horns nearly or quite as large as the males, the females of the Javan species are frequently or invariably hornless. A large male Indian rhinoceros, measured by General Kinloch, stood 5ft. 9in. at the withers, and measured in girth one inch less; while its total length, exclusive of the tail, was $10\frac{1}{2}$ ft. As a rule, the horn is not more than 8in. in length, although specimens have been recorded slightly exceeding a foot. This species is a grass-eating animal, now confined to the grass-jungles of the plains of Northern India. Within historic times its range extended, however, into the Punjab; and fossilized teeth found in various parts of India prove that in earlier epochs it ranged over the greater part of the continent, extending as far south as Madras. Moreover, a nearly allied fossil species found in the Siwalik Hills of Northern India, of which a tooth is represented in Fig. 77, indicates that this type of rhinoceros has existed in India from a date when the

country was peopled with a host of extinct mammals quite unlike any now living.

The Javan rhinoceros (*R. sondaicus*) is so-called on account of being the only species inhabiting Java; but, far from being confined to that island, is also found in Sumatra, Borneo, the Malay Peninsula, Burma, Assam, and the Bengal Sanderbans. At the shoulders, according to Mr. Blanford, it stands scarcely, if at all, lower than the Indian rhinoceros, but is a smaller headed and smaller bodied animal; while it differs in the arrangement of the folds of the skin, and the absence of the large tubercles studding the hide of the larger species. Precise measurements of adults are, however, still wanting, and sportsmen will do good service to natural history by supplying this deficiency. Single-horned fossil rhinoceroses closely resembling this species in the structure of their molar teeth are found in the Siwalik Hills of Northern India, thus indicating that India was probably the original home of this type. What, however, is far more remarkable is the occurrence of remains of a rhinoceros probably allied to this species on the Hundes plateau of the Himalaya at an elevation of some 16,000ft. And since it is highly improbable that the Himalaya can have been raised to such a stupendous height since the comparatively recent epoch when these rhinoceroses lived, the

minds of some writers have been much exercised to discover how such creatures could have acquired sustenance in regions now so barren and desolate. When, however, we remember, that the yak—a near ally of the bison of the plains—flourishes in these regions, we fail to see why a rhinoceros allied to one now dwelling in the plains of India should have had any special difficulty in adapting itself to similar conditions of life.

The Sumatran, or two-horned Asiatic rhinoceros (*R. sumatrensis**), has nearly the same distribution as the preceding species, but is unknown in Lower Bengal and Java, and is found in Siam. This is by far the smallest of all living rhinoceroses, the average height of full-grown individuals being estimated by Mr. Blanford at from 4ft. to 4½ft. One adult female measuring only 3ft. 8in. at the shoulder has been recorded. In regard to its horns this rhinoceros affords the sportsman far more satisfactory trophies than either of its Asiatic cousins. Above their bases both horns are slender and well-formed, the longer front one, corresponding to the single horn of the other species, when well developed, sweeping backwards in a shapely curve. The largest horn hitherto

* The author is indebted to Messrs. Macmillan & Co. for the figures of this and the African species.

recorded measured upwards of 32in. along the curve, but anything like this length is very rare.



FIG. 79.—SUMATRAN RHINOCEROS. (From "Nature.")

The Sumatran rhinoceros is far more hairy than

any other living member of the genus ; but there is considerable individual variation in this respect, and also as to the colour of the body and hair, that of the former varying from an earthy brown to black, while that of the latter is some shade of brown or black. It was an unusually long-haired specimen, of a light colour, and with the edges of the ears fringed with long hairs, which led Mr. Sclater to believe that there were two living representatives of this group. Accordingly, it was proposed to distinguish the more hairy form, in which a rufous tint prevailed in the hair, as a distinct species, under the name of the hairy-eared rhinoceros (*R. lasiotis*). In spite, however, of certain differences in the form of the skull, this new departure has not commended itself to the majority of naturalists, who prefer to regard the more hairy form merely in the light of a variety of the Sumatran species.

The Sumatran rhinoceros is a forest-dwelling animal, whose diet probably consists mainly of leaves and twigs. In this respect it agrees with the Javan species, which has molar teeth of precisely the same structure ; this type of tooth, as we shall see latter on, being invariably associated with leaf and branch-eating habits, while the type found in the Indian rhinoceros indicates grass-eating habits. The Sumatran rhinoceros is especially addicted to hilly

districts, and has been found in Tenasserim at an elevation of 4000ft. Mr. E. Bartlett states that it is now becoming rare in most parts of Borneo. So far as our present information permits of judging, it would appear that rhinoceroses of the type of the Sumatran species are comparatively recent immigrants into the east, since their remains are unknown in the rocks of the Siwalik Hills and other Indian fossiliferous deposits. Extinct European rhinoceroses found in the Lower Pliocene and Upper Miocene deposits of the Continent, such as Schleiermacher's rhinoceros (*R. schleiermacheri*), attest, however, the antiquity of this group of the genus; and, taken in connection with other fossil animals, show that there has been an eastward migration in later times of types formerly inhabiting western Europe.

The African rhinoceroses, as already mentioned, differ from the Asiatic species in the total absence of tusks and cutting-teeth from the front of the jaws, and in the want of permanent folds in their skin. Both species, it need hardly be mentioned, have two horns, which may attain far larger dimensions than those of any of the Asiatic species.

The common or so-called black African rhinoceros (Fig. 80) is the smaller of the two species, and is readily characterised by its prehensile upper lip.

This species—technically known as *Rhinoceros bicornis*—has molar teeth of the pattern of those of the Javan and Sumatran species, and subsists entirely upon twigs and branches. The natives believe that there are two species of this rhinoceros,

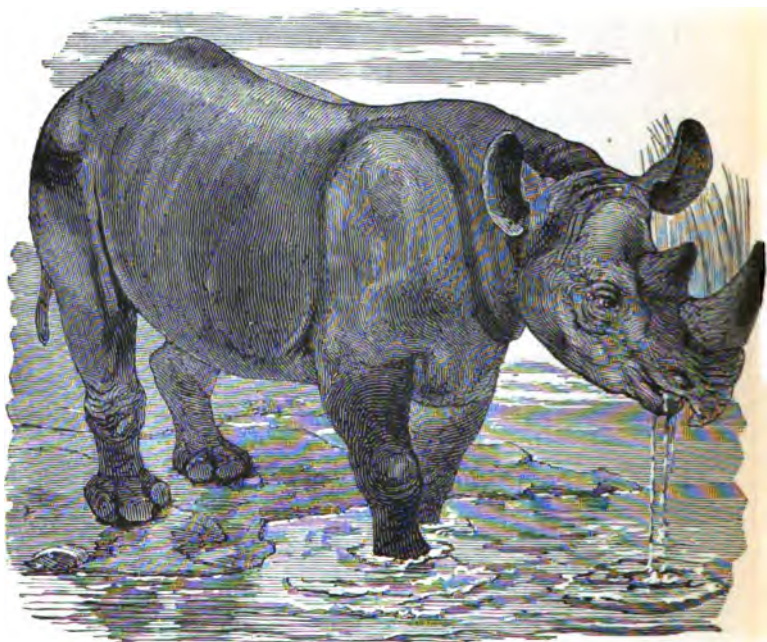


FIG. 80.—THE COMMON AFRICAN RHINOCEROS. (From "Nature.")

applying the name of borele to that variety in which the second horn is not more than about 8in. in length; while those individuals with the second horn of from 1ft. to 2ft. in length they term keitloa.

Mr. Selous has, however, shown conclusively that there is a perfect gradation from specimens in which the second horn forms a mere nodule, to those in which the two horns are nearly equal, and thus to those rare instances where the second is the longer of the two.

Sir Samuel Baker states that the longest horn of any individual of this species he ever shot measured 23in. long; but, although Mr. Selous does not give us the benefit of his experiences in this matter, specimens are on record of over 40in.

The common African rhinoceros has an extensive geographical range, occurring from Cape Colony to Abyssinia, in such regions as are suitable to its habits. Although formerly abundant, this species has of late years been greatly reduced in numbers. Mr. Selous tells us that while this rhinoceros always walks with its nose high in the air, and the calf invariably follows its mother, in the case of the next species the nose is carried close to the ground, and the calf trots in front of its dam. A male of this species, shot by Sir John Willoughby in the Kilimanjaro district, had a small and irregularly-formed third horn, placed a short distance behind the second.

This rhinoceros has been exhibited in European menageries, where it thrives well, a large male,

which died there in 1891, having been in the menagerie of the Zoological Society since 1868. Since this individual was about two years old when received by the society, its age at the time of its decease may be roughly estimated at from twenty-four to twenty-five years. That it had not reached its full term of life is, however, indicated by the cause of its death being due to disease of the heart, complicated by cancer of the stomach, and a cutaneous complaint. This rhinoceros came from Upper Nubia, and is the one represented in our illustration. Mr. Selous attributes to this species a gentle and inoffending disposition; but in this respect he is not in accord with Mr. Drummond and several other writers on African sport.

By far the largest of all the living representatives of the genus is Burchell's, or the square-mouthed, rhinoceros (*R. simus*), which stands as much as 6½ft. at the shoulder, and is, next to the elephant, the largest of all land mammals. Although frequently known as the white rhinoceros, there is, according to Mr. Selous, no perceptible difference of colour between this and the preceding species, both being of a slatey hue. The bluntly truncated upper lip (apart from its superior size and its enormous head) serves, however, at once to distinguish the present species.

Burchell's rhinoceros feeds exclusively upon grass, and has tall-crowned upper molar teeth of the general pattern of those of the great Indian rhinoceros, but of still more complex structure, and with the hollows filled with cement. As we have already seen that the branch-eating common African rhinoceros has molar teeth like those of the forest-dwelling Javan and Sumatran rhinoceroses, and since the Indian rhinoceros is an inhabitant of grass jungles, we may take it as certain that, while molar teeth of the type of those of the Sumatran species indicate branch-eating habits, those of the Indian and Burchell's rhinoceroses are correlated with grazing habits. This indication, needless to say, is of great importance when we have to investigate the probable habits of the fossil members of the group.

The horns of Burchell's rhinoceros attain a greater length than those of any other living species—the front horn varying from some 18in. to over 4ft. in length. Mr. Selous states, however, that, owing to the finest specimens of the animal having been killed, it has been of late years rare to meet with horns exceeding 3ft. in length. Although usually bent somewhat backwards at the tip, some examples of the front horn are either straight or curve slightly forwards. When a straight or

forwardly bent horn exceeds 3ft. in length, it will obviously touch the ground in front of the animal's nose at such times as the head is bent down in feeding; hence, as Mr. Selous points out, the front surface of the tips of such horns is usually abraded by friction with the ground. The same writer states that a front horn of this species may always be distinguished from that of the common species by its more or less flattened anterior surface. In length, the posterior or second horn may vary from a mere nodule to upwards of 2ft.

The largest example of the front horn of Burchell's rhinoceros appears to be one in the British Museum, measuring $56\frac{1}{2}$ in. along the curve. Mr. Selous states that he has seen a horn of 54in. in length, and has shot a rhinoceros in which the front horn measured 43in. One exhibited by Mr. Oswell in 1890 had a length of 45in.; while there are specimens in the British Museum measuring 43in., 42in., 40in., and 37in.; and Sir E. G. Loder has one in his collection at Horsham measuring $40\frac{1}{4}$ in. long, and 22in. in basal circumference, and weighing 13lb.

Instead of frequenting the wood-clad, broken ground favoured by the common species, Burchell's rhinoceros is found on the forest-clad sand-belts and broad grassy valleys skirting the hills in the districts

to the southward of the Zambesi. In former years this species appears to have been common enough in South Africa, some of the earlier hunters writing of their having shot as many as eight in a single night at their drinking pools (more's the pity!). Now, however, this rhinoceros is exterminated from most parts of South Africa, although in the years 1878 and 1880 Mr. Selous reports having found it still fairly numerous in a small tract of country in north-east Mashonaland, where a few individuals still lingered in 1892. Here, however, unless special means of protection are taken for the few survivors, its destruction is but a matter of time, and it is but too probable that ere long this magnificent species will cease to exist throughout the length and breadth of the Dark Continent. No example of Burchell's rhinoceros has ever been brought alive to Europe, and it is now probable that such an addition to our Zoological Gardens will never be made. Mr. Selous, writing in 1882 from the Matebele country, stated that the very few individuals of this rhinoceros that still survived in that part of Africa were then almost entirely restricted to the "fly"-infested districts, so that their pursuit was well nigh an impossibility.

Unfortunately, in spite of the number of individuals shot by the earlier pioneers of African sport, our

museums have been hitherto badly off for skulls of this species, while of the skeleton there are absolutely no examples in this country. The British Museum possesses, indeed, two adult and two young skulls; while the museum of the Royal College of Surgeons has one magnificent skull, with the horns still affixed, which was shot by Gordon Cumming. The length of this skull is 35in., that of the front horn 34in. in a straight line, and that of the second horn 10½in. The front horn, which is nearly straight, shows the mark on the front of the tip made by rubbing against the ground. There is also a fine stuffed head, with the skull preserved separately, in the Free Museum at Liverpool. Mr. Selous has, however, recently procured a fine skull and skin for the British Museum.

It is a curious fact in natural history that, whereas a considerable number of large animals of peculiar types are now restricted to Africa, yet in past times such creatures were well represented in other regions of the globe. And in no instance is this better exemplified than in the case of the smooth-skinned, two-horned rhinoceroses without tusks or cutting teeth, which, although now confined to Africa, had formerly a wide distribution.

Of those allied to Burchell's rhinoceroses there are two well-marked fossil species, one of which

occurs in the rocks of the Siwalik Hills of Northern India, belonging to the Pliocene period of geologists, while the other was distributed over Northern Europe and Asia during the succeeding Pleistocene age. The Indian Siwalik species, known as the broad-nosed rhinoceros (*R. platyrhinus*) is represented by a magnificent skull in the British Museum, which indicates an animal nearly or quite as large as the living African species. Its molar teeth are nearly similar to those of the latter, and we may hence confidently assume that it was a grass-eater; while, from its geological and geographical positions, it may not improbably be regarded as the ancestral type of both the African Burchell's rhinoceros and the under-mentioned extinct species.

The woolly rhinoceros (*R. antiquitatis*), as the fossil European species of this group is commonly termed, is known to us not only from skeletons, skulls, and teeth found in various parts of Europe, but likewise by entire carcases preserved in a frozen condition in the ice of the Siberian "tundras." From these mummified specimens we learn not only that this animal was covered with a thick coat of woolly hair, to afford protection against the cold of the regions in which it dwelt, but also that its skin was devoid of the folds characteristic of the Asiatic species, and thereby resembled that of its African

ally. The horns of this mighty beast have also been in many cases preserved in the ice, and appear, although I have not measurements of the largest examples before me, to have nearly, or perhaps quite, rivalled those of Burchell's rhinoceros in point of size.

From the similarity in the structure of its molar teeth to those of the last-named species, there would seem but little doubt that the woolly rhinoceros was also a grass-eater—at least, originally. It appears, however, that in the interstices of the molar teeth of at least one Siberian example, portions of needles of conifers and leaves of other trees have been detected; and it has accordingly been assumed that this animal was a branch-eater. Unfortunately, little or nothing is known of the condition of Siberia in those early days, although it may be doubted whether grass would have been found in sufficient quantity to satisfy the wants of such bulky animals as these rhinoceroses. Hence it is quite probable that, although the woolly rhinoceros in the more southern part of its range was altogether a grass-eater, yet that by stress of circumstances it may have been compelled in Siberia to supplement its proper diet, to a larger or smaller extent, by leaves and shoots.

.. The earliest known ally of the common African

rhinoceros (*R. bicornis*) is a species from the early Pliocene strata of Attica, known as *R. pachygnathus*, which was so closely allied to the living species that some attention is necessary to find out well-marked points of distinction between the two. There were, however, many other species of extinct rhinoceroses, more or less nearly allied to the common African

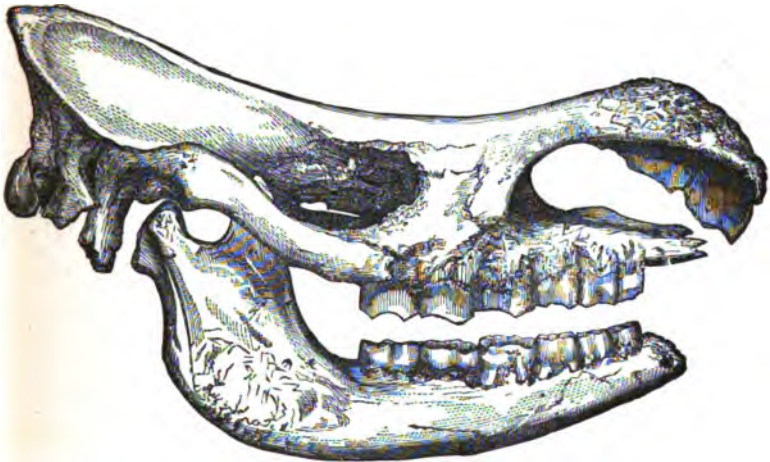


FIG. 81.—SIDE VIEW OF SKULL OF FOSSIL ENGLISH RHINOCEROS.

rhinoceros, which inhabited various parts of the world during the succeeding Pleistocene age. Thus, in England, and Europe generally, there were no less than three kinds of rhinoceroses of this group living in the last-named period; all of which agree with the African *Rhinoceros bicornis* in the structure of their

molar teeth, and the absence of tusks and cutting-teeth in the front of the jaws. Two of these, respectively known as the Leptorhine and Megarhine rhinoceroses, have left their remains in the brick-earths of the Thames Valley; while the third and smaller species, known as the Etruscan rhinoceros, occurs in the somewhat older deposits of the Norfolk coast termed the "Forest-bed," and likewise in the uppermost beds of the Pliocene period in Italy and France. The Leptorhine and Megarhine species, as shown in the figure of a skull of the former, are characterised by having a bony partition dividing the two chambers of the cavity of the nose. In this respect they resemble the woolly rhinoceros already referred to; and it has been suggested that the object of this ossification was to aid in strengthening the skull for the support of the massive horns. Since, however, a similar feature is occasionally found in one of the smaller Asiatic rhinoceroses, while it is invariably wanting in Burchell's rhinoceros, it would seem that this is not the true *raison d'être* of the partition in question. That all these three species lived on boughs and foliage may be safely inferred from the structure of their molar teeth; and, as further evidence of their affinity, it may be mentioned that a carcase of either the Leptorhine or Megarhine kind found in the Siberian ice showed

that the skin was of the smooth type characteristic of the African rhinoceroses.

Fossil rhinoceroses akin to the African *R. bicornis* were, however, by no means restricted to the European area. Thus from the superficial and cavern deposits of Southern India there have been obtained remains of two small species—respectively known as the Deccan and the Karnul rhinoceros—which, from the absence of tusks and cutting-teeth in the jaws, and the structure of their molars, were evidently allied to the common African rhinoceros, although complete skulls of either have not yet been discovered.

These Indian two-horned and tuskless rhinoceroses, together with the large Platyrrhine species allied to Burchell's rhinoceros, already mentioned, clearly show that in its earlier days India was inhabited by rhinoceroses nearly related to those now restricted to Africa; while the occurrence of remains allied to the Javan and Indian rhinoceros as unmistakably indicates that it was likewise tenanted by kinds akin to those still characteristic of Asia. This blending of African and Indian forms occurs in other groups of animals found in the Pleistocene and Pliocene deposits of India; and we have at present no satisfactory explanation to offer of the circumstance that, while those types which now occur in Africa have disappeared from India,

such as persist in the latter area are unknown in the former.

This completes our list of rhinoceroses now living on the globe and their nearest extinct relations. In some of the Tertiary rocks of India and Europe there occur, however, remains of other rhinoceroses which differ from all living forms in the total absence of horns. Moreover, in such of these earlier species as the limbs have been discovered, the fore feet differ from those of all modern rhinoceroses in having four separate toes; so that, in this respect, these animals were one step less widely removed from the tapirs than are their existing allies. Some of these extinct hornless rhinoceroses were of gigantic size, and all of them were provided with cutting-teeth and tusks in the jaws, while their molar teeth were of the type obtaining in the Sumatran species. Hence we may conclude that these early rhinoceroses were branch and leaf-eaters. This, indeed, is exactly what might have been predicated *à priori*, since all the older Ungulate mammals had short-crowned molars adapted for champing boughs, leaves, or succulent reeds; and it was not till a later period, when we may presume that extensive grassy plains first formed a prominent feature in the landscape of the world, that species with tall-crowned teeth, adapted for com-

minuting grass by a grinding motion, came into existence.

Hitherto we have spoken only of Old World rhinoceroses, but certain kinds found fossil in the Tertiary rocks of the United States prove that this group of animals formerly extended to North America, although they are quite unknown in the southern half of the New World. These North

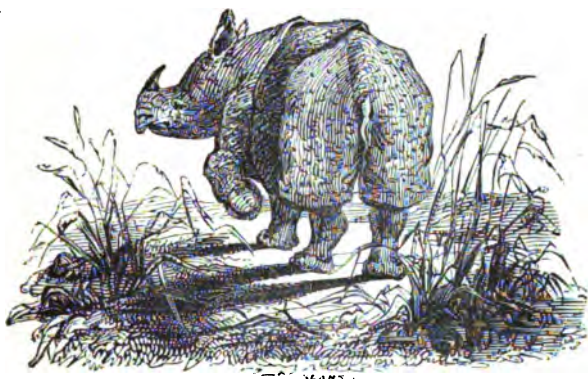


FIG. 82.—BACK VIEW OF GREAT INDIAN RHINOCEROS.

American rhinoceroses were hornless, but, instead of resembling their Old World hornless cousins in having four toes to the fore feet, they agreed with the living species in having only three toes to all the feet. In bodily form, the American hornless species were, however, different from all others. Thus, whereas the Old World rhinoceroses have legs of considerable length in relation to their bodies, the

American species were distinguished by the extreme shortness of their legs, and the great length of their bodies. Consequently they had more the general appearance of a hippopotamus than that of an ordinary rhinoceros; and from this peculiarity we may infer that they constituted a side branch which had no connection with the direct pedigree of modern rhinoceroses.

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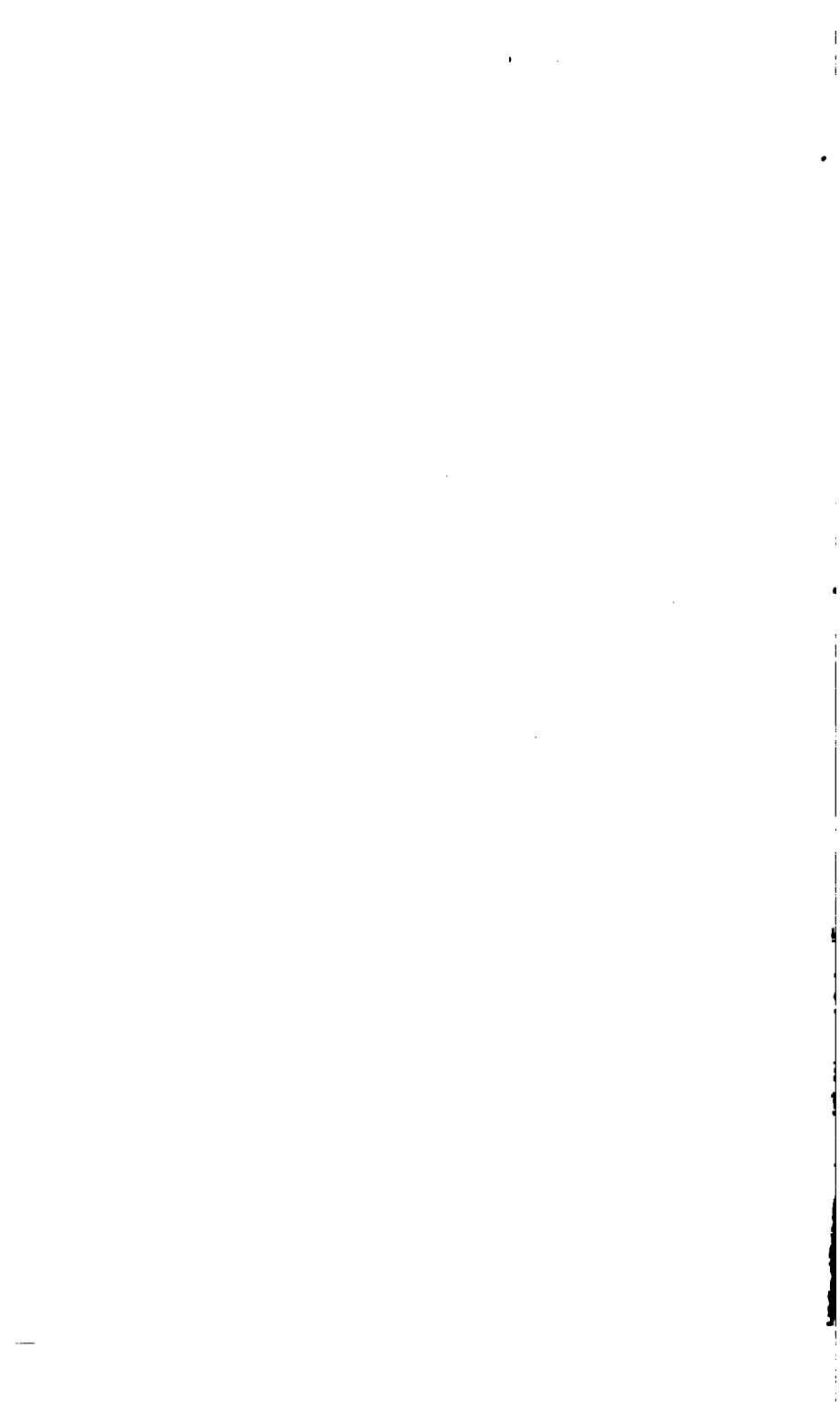
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